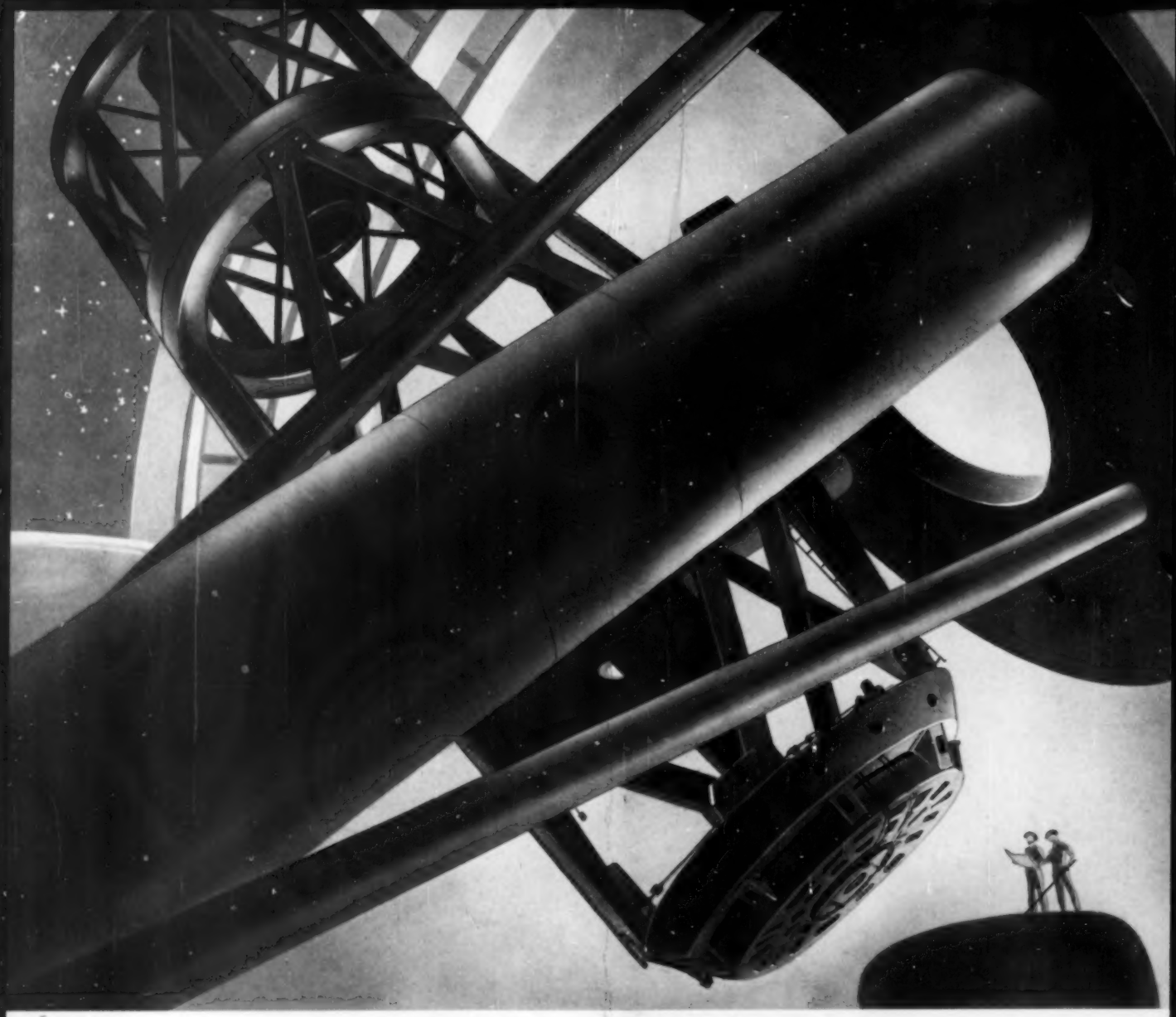
November, 1957 Vol. 46 No. 9

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine



Pioneers of the universe

The scientists' search for knowledge of the universe has proceeded at an unprecedented pace during this 20th century. Their mighty telescopes have pushed back the shrouds of the unknown many *billions* of miles into space. But who are these scientists? One thing is certain. These pioneers of the universe are yesterday's youth. But more than that, they are those fortunate few in whom the spark of achievement was kindled into a flame so that their work might transcend anything the world has ever known before.

These are important facts for the youth of today who yearn for a life of success. The ability to rise above the ordinary is not a happenstance of birth or superior energy. It is most frequently merely a matter of ideals. Somewhere during the formative days of youth comes a turning point wherein the man of tomorrow clears his thinking, begins to train himself in weighing values, starts a lifelong discrimination between the good and the shoddy which so definitely marks *every* man who rises to great success.

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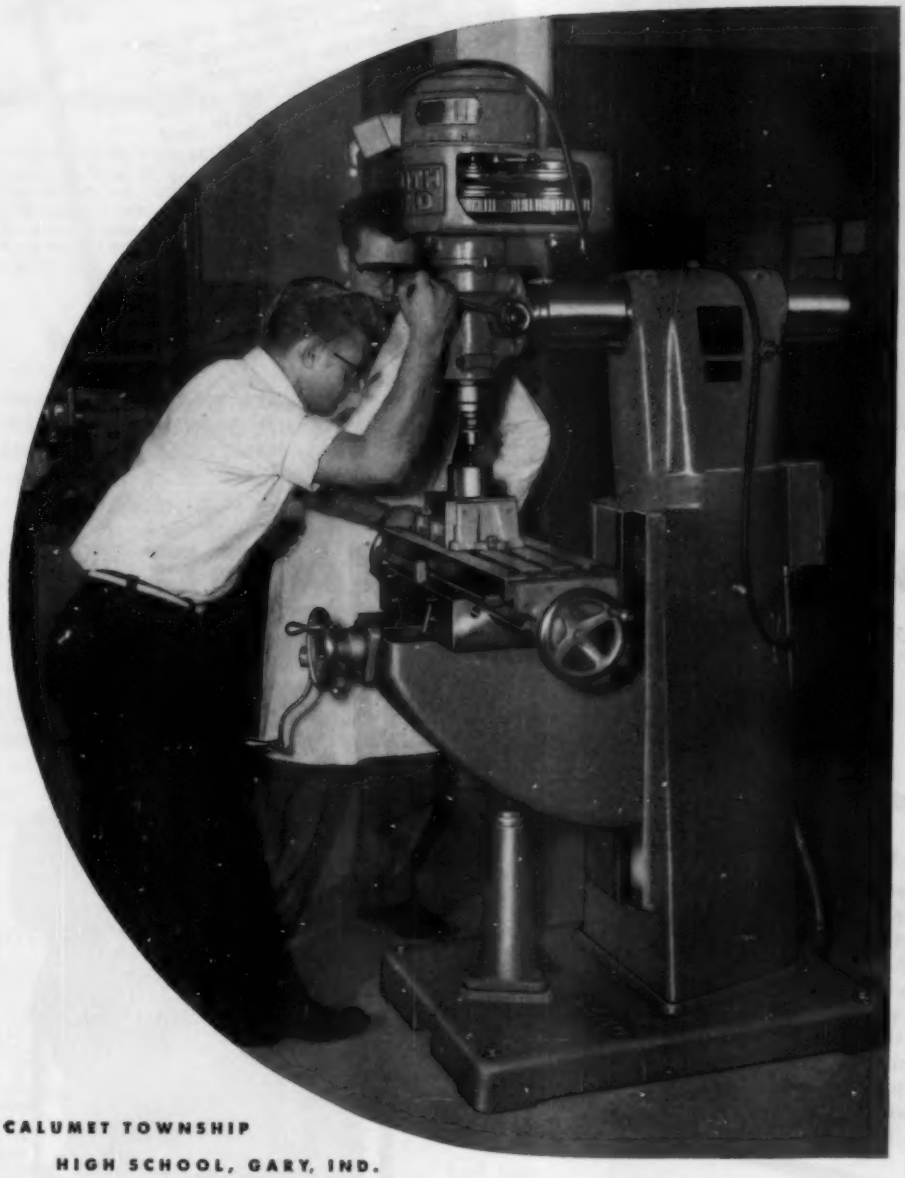

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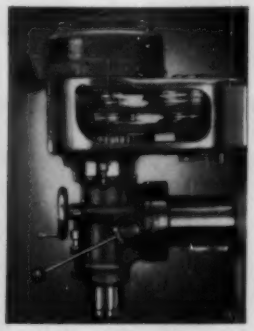

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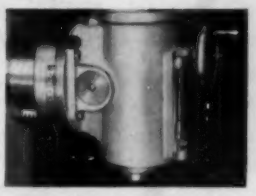

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Teaching Helps

Training films, project books, operators manuals, wall charts, etc. to make teaching easier. Write for bulletins.

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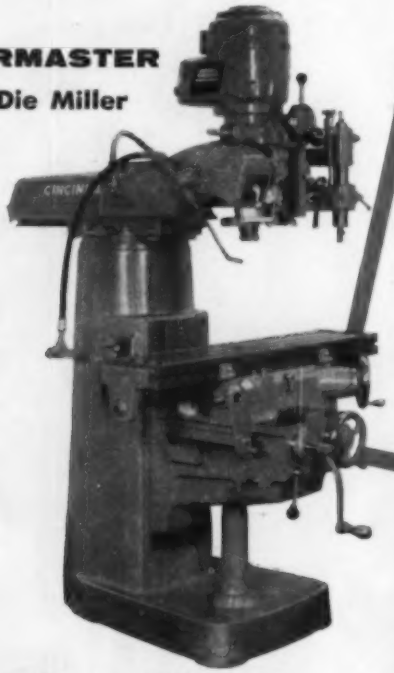
Tool and Die Miller



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THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO

NOVEMBER
1957

VOL. 46 NO. 9

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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☆ ☆ ☆

This Month's Cover

The cover picture this month shows a display of students' seventh grade mechanical drawing booklet covers. The covers are designed and drawn about midterm which allows the students a break in the usual class routine. The only requirements are that the pupils include the title "Introductory Drawing," and their names on their covers. The covers are decorated with colored pencils or colored India inks.

The photograph includes two seventh grade pupils and Mr. Carlyle E. Ragsdale, teacher at the Alexander Hamilton Junior High School, Seattle, Wash., who sent the picture to us.

Photo by Eddy J. Mannery, Seattle, Wash.

BUY U. S. SAVINGS BONDS

☆ ☆ ☆

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Articles Indexed.—The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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Association News

COMING CONVENTIONS

Oct. 24–25. Minnesota Vocational Association, at St. Paul Hotel, St. Paul, Minn. Secretary, Mr. Deane A. Turner, Waseca, Minn.

Nov. 6–7. Missouri Vocational Association, at Jefferson Hotel, St. Louis, Mo. Secretary, H. H. London, University of Missouri, Columbia, Mo.

Nov. 7–8. Iowa Vocational Association, at Hotel Savery, Des Moines, Iowa. Secretary, M. Z. Hendren, State Office Bldg., Des Moines, Iowa.

Nov. 7–9. Mississippi Valley Industrial Arts Conference, at LaSalle Hotel, Chicago, Ill. Chairman, Dr. Verne C. Fryklund, Stout State College, Menomonie, Wis.

Nov. 8–9. Oregon Industrial Arts Association, at South Eugene High School, Eugene, Ore. Chairman, O. N. Mickelson, 400 East 19th St., Eugene, Ore.

Nov. 12. New England Industrial Arts Teachers Association, at Burlington, Vt. Secretary, Ralph M. Killelea, Warren Harding High School, Bridgeport 10, Conn.

Nov. 28–30. Central Association of Science & Mathematics Teachers, at Congress Hotel, Chicago, Ill. Secretary, Virginia Terhune, Proviso Township High School, Maywood, Ill.

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For every school shop, laboratory and classroom . . . (from beginning classes in industrial arts and vocational education through advanced courses in trade schools and universities) . . . Sheldon builds a lathe to fit each academic, space and budget requirement.

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☐ 13" ☐ 15" Sebastian Geared Head Lathes
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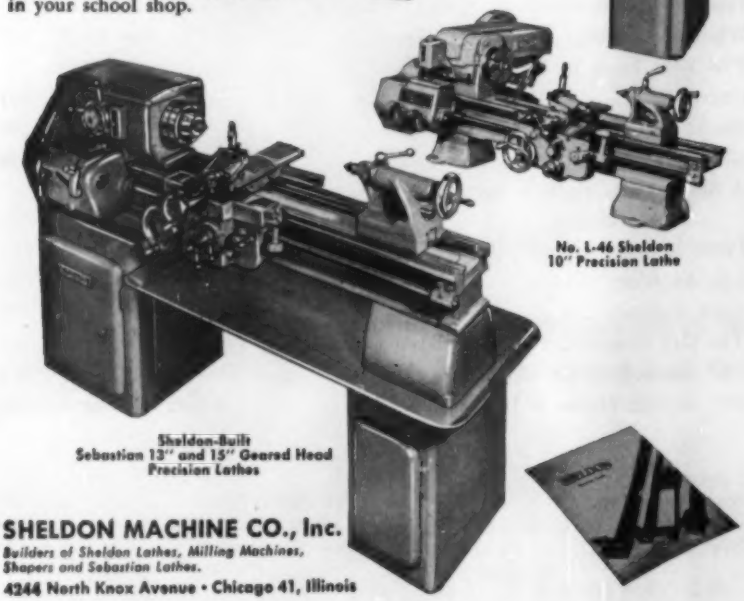
13" Swing
Precision Lathe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Sebastian 13" and 15" Geared Head
Precision Lathes

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ARIZONA INDUSTRIAL ARTS ASSOCIATION

The Arizona Industrial Arts Association will meet at the Pueblo High School, Tucson, Ariz., during the 66th Annual Convention of the Arizona Education Association, November 8 and 9.

William R. Mason, supervisor of industrial arts education, Board of Education, Cleveland, Ohio, and vice-president representing the Industrial Arts Section of the American Vocational Association, will address one of the Area Meetings of the Arizona Education Association on Friday afternoon, November 8. The subject of his address is "Vocations Tomorrow."

He will be introduced by Mrs. Eva Scully, president of AVA, and a member of the Arizona State Department of Education.

Mr. Mason will also address a breakfast meeting of the Arizona State Vocational Association, of which the Arizona Industrial Arts Association is a section.

Election of officers for the year 1957–58 will be conducted during the sectional meeting which follows the breakfast meeting.

The current officers of AIAA are: Leo C. Houghton, president; Clarence J. Hansen, vice-president; and Robert L. Dawson, secretary-treasurer. — *Leo C. Houghton.*

OREGON INDUSTRIAL ARTS ASSOCIATION

The Oregon Industrial Arts Association will hold its third annual Industrial Arts Fall Conference November 8 and 9, 1957, at Eugene, Ore., with headquarters in South Eugene High School.

Registration will start at 3:30 p.m., on Friday, and the program will continue until Saturday, November 9, at 5:30 p.m.

Friday's program will include a get-acquainted time, and a banquet with music and a speaker.

On Saturday the Epsilon Pi Tau breakfast will be held at 7:00 a.m. There will be commercial exhibits and demonstrations, a luncheon at noon, school demonstrations, and time for visiting.

The South Willamette Industrial Arts Association, sponsors of this year's conference, is one of several geographical-area associations in Oregon.

The state officers are: president, Al Riendeau, Portland; vice-president, Ed Hinckley, Eugene; secretary, Floyd Peterson, Portland; and treasurer, Gordon Asbury, McMinville. — *O. N. Mickelson, chairman.*

KENTUCKY INDUSTRIAL EDUCATION ASSOCIATION

On April 11, 1957, the industrial education teachers of the Commonwealth of Kentucky, co-operatively and enthusiastically committed themselves to professional advancement through the organization of the Kentucky Industrial Education Association. The newly formed association will serve the industrial arts, vocational industrial and distributive education teachers of the state.

At the organizational meeting, the following officers were elected: president — Dr. Charles Crumpton, teacher trainer, University of Louisville; vice-president, T. & I. — Devert Owens, area director, Hazard Area Vocational School; vice-president, industrial arts — Louis Rogge, industrial arts instructor, DuPont Manual High School, Louisville;

(Continued on page 6A)

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No. 16 NIBBLER

NEW Black & Decker
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Two New B&D Tools improve sheet metal training!

Faster, lighter, easier handling, POWER-BUILT and packed with features

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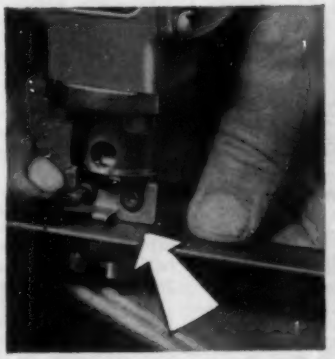
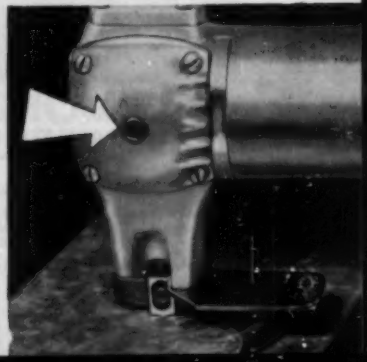


UP TO 3 TIMES FASTER than competition, new B&D Nibbler has twice the life, 20-30% less weight, reversible punch. Adjustable stripper plate (left), smaller diameter (right) are extra features.

50% FASTER than competition, new B&D Shear has one-third less weight than closest competitor, lasts much longer. Deflector plate prevents curling of material. Adjusting screw allows quick positioning of blade.



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ASSOCIATION NEWS

(Continued from page 4A)

treasurer — Ray Lawrence, supervisor, department of industrial arts, Louisville City Schools; secretary — C. Nelson Grote, assistant director of industrial education, State Department of Education.

The first Kentucky Industrial Education Association Conference will be held November 1 and 2, 1957, at the Kentucky Hotel, Louisville, Ky. An outstanding program has been planned, which will include general sessions, sectional meetings, educational exhibits as well as commercial exhibits.

Charles R. Crakes, DeVry Technical Institute, Chicago, will speak at the first general session on "Trends and Occupational Opportunities for American Youth."

The following day, James L. Patton, director of the Bureau of Vocational Education, State Department of Education, Frankfort, will serve as the banquet speaker on the subject "The Challenge of Industrial Education."

Personal News

PROF. KRAEHENBUEHL HONORED

John O. Kraehenbuehl, distinguished teacher of the science of lighting, recently received the Illuminating Engineering Society's highest honor, the Gold Medal Award.

The presentation was made by Marshall N. Waterman of Bloomfield, N. J., president of the I.E.S., at the opening session of the professional organization's annual national technical conference at the Biltmore Hotel at New York City.

Professor Kraehenbuehl, who is presently developing a pre-engineering curriculum at Colorado College, Colorado Springs, recently retired as professor emeritus in electrical engineering at the University of Illinois, Urbana, after 35 years as a faculty member of that institution. Previously he taught electrical engineering at Des Moines (Iowa) College, and mathematics at the University of Tennessee.

He was chosen as a medalist in recognition of "his far-reaching effect on the techniques of illumination in his long academic career, and his personal sacrifices in promoting the nation's general welfare through teaching the importance of scientific lighting."

The medal is given annually to individuals who, "by distinguished contributions, have conspicuously furthered the art, knowledge and profession of illuminating engineering." The award was established in 1944. Professor Kraehenbuehl is the eleventh recipient, no presentations having been made in 1951 and 1953.

FACULTY PROMOTIONS AND CHANGES

Dr. Henry A. Loats, department of industrial arts, Ball State Teachers College, Muncie, Ind., has been promoted to professor of industrial arts effective September 1, 1957.

Dr. Lloyd P. Nelson, department of industrial arts, has been promoted to Associate Professor of Industrial Arts.

Kenneth H. Bergman is instructor of industrial arts, and will have charge of the electricity classes and several elementary industrial arts classes.

William H. Middleton is instructor of

(Continued on page 8A)

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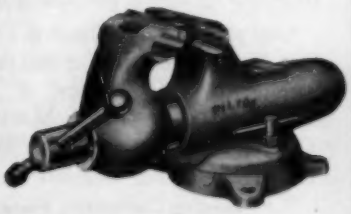
A logical way to measure vise values!

Now, Wilton Tool Mfg. Co., Inc., offers you a logical method for selecting machinists' vises. New, free specification sheets on Wilton vises enable you to compare Wilton Machinists' Vises with the make you're now buying, feature by feature. They'll enable you to see for yourself that Wilton Machinists' Vises are unsurpassed in design, construction and performance, even though they cost no more than ordinary vises!

★ 60% more strength
★ permanent sealed-in lubrication
★ 360° rotation, double lock nuts
★ unconditionally guaranteed for five years!

WRITE FOR WILTON'S MACHINISTS' VISE AND WOODWORKERS' VISE SPECIFICATION SHEET TODAY!



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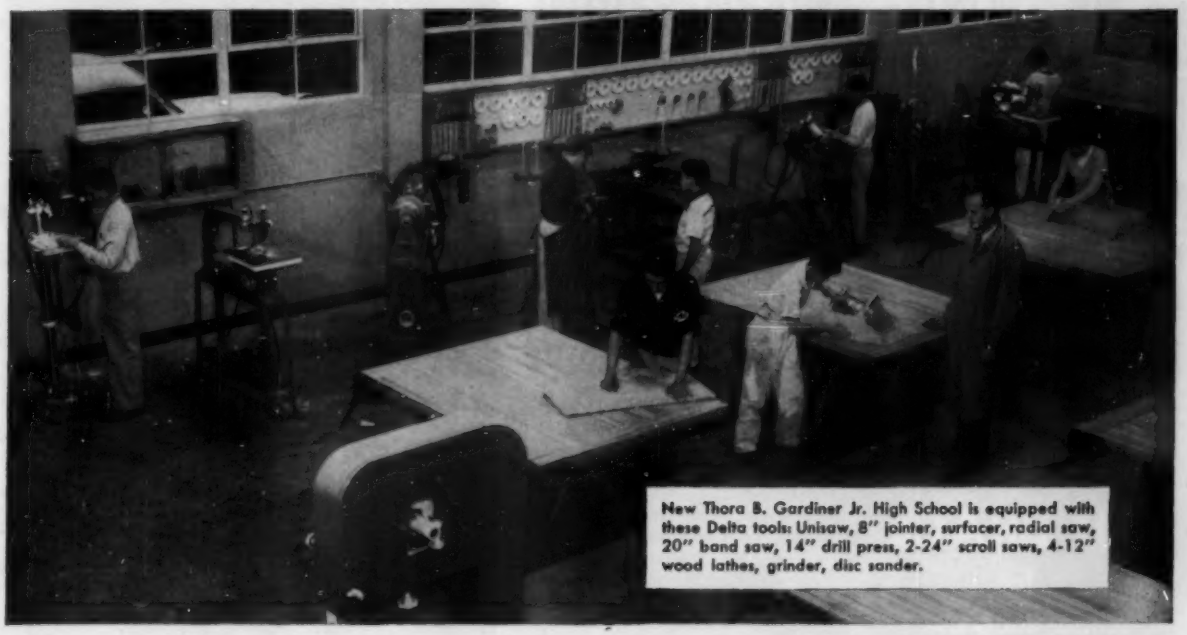
DELTA power tools



New Thora B. Gardiner Jr. High School is equipped with these Delta tools: Unisaw, 8" jointer, surfacer, radial saw, 20" band saw, 14" drill press, 2-24" scroll saws, 4-12" wood lathes, grinder, disc sander.

. . . first choice for the new school shop

at Thora B. Gardiner Jr. H. S., Oregon City, Oregon

In his 16 years as industrial arts instructor, Gale Bentz has had experience not only with Delta, but with major tools of all sizes and types. Although ample funds were available to purchase heavier, expensive machines, Mr. Bentz chose Delta—here's why:

STUDENTS LEARN QUICKLY, SAFELY—"Delta's simplicity and ease of handling make it possible for our students to learn woodworking machine operation in just eight weeks," says Mr. Bentz. But even more important, according to Mr. Bentz, is that Delta's many built-in safety features give complete student protection.

RUGGED DURABILITY—According to Mr. Bentz, Delta's proved ability to give dependable operation, year after year, played an important role in selecting tools for the new school shop. "We wanted tools that could withstand hard, continuous student operation without expensive, time-consuming maintenance," said Mr. Bentz.

PROMPT DEALER SERVICE—Another important reason for choosing Delta was the excellent cooperation and service provided by Delta Dealers. According to Mr. Bentz, they not only carry complete Delta stocks, but take an active interest in the school's shop program.

SEE THE ENTIRE DELTA POWER TOOL LINE—Get all the facts—compare—then make up your *own* mind! Your Delta Dealer is listed under "TOOLS" in the Yellow Pages of your phone book.

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PERSONAL NEWS

(Continued from page 6A)

industrial arts, and will have charge of the drafting area.

Graduate assistantships in the department of industrial arts at Ball State Teachers College for the school year 1957–58, have been awarded to the following men: James T. Granger, Northern Illinois State University; James R. Grover, Western Illinois State University; Joseph D. Irvin and Russell A. Poor, Ball State Teachers College; and Sanford E. Rich, Teachers College of Connecticut.

DR. MILLER PROMOTED

Beginning with this academic year, Harold J. Miller was promoted to associate professor, Santa Barbara College, University of California, Santa Barbara, Calif.

Dr. Miller completed the requirements for the doctoral of education degree at Oregon State College in the summer of 1955, and this sabbatical leave for research and travel was a postdoctoral project.

DR. ROBERT F. OXNAM NAMED PRESIDENT OF PRATT INSTITUTE

The appointment of Dr. Robert F. Oxnam as president of Pratt Institute in Brooklyn was announced recently.

Dr. Oxnam, who has been vice-president for administrative affairs and Associate Professor of Government at Boston University since 1953, assumed his new duties October 1, 1957. He succeeds Dr. Francis H. Horn, who recently resigned.

Dr. Oxnam was assistant to the chancellor of Syracuse University from 1950 to 1953.

Which is
THE BEST BIT BRACE for school shop use ?
You'll find the answer — according to thousands of school shop instructors — in the famous Millers Falls line.
Possibly you'll prefer the No. 772, an outstanding favorite with generations of expert craftsmen... or the No. 1950 with its unbreakable "Tenite" head and handle... or any one of the other popular models. There are Millers Falls bit braces in every price range.
You'll find them all smooth-acting, accurate, rugged — and the kind of tools that encourage students to do their best work.
Ask to see them at your supplier's — or write direct for detailed literature.
UNBREAKABLE HEAD
No. 1950 has head and handle of glossy red "Tenite". Ball bearing head, Barber chuck.
POPULAR
No. 1322, one of the most popular ever made. Boxed ratchet mechanism, self-opening jaws.
"HOLDALL"
No. 732 is equipped with universal type chuck that holds square, taper or round shanks to ½" diameter.
FAVORITE OF EXPERTS
No. 772 has full ball bearing construction, Lion universal type chuck; beautifully finished throughout.
MILLERS FALLS TOOLS
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NEW FACULTY MEMBERS NAMED

Eugene Buck, formerly of the Aberdeen High School, has been added to the teaching staff at Nebraska State Teachers College, Kearney, Neb., as head of the graphic arts department.

Ora Lindau of the Kearney Public Schools, has been placed in charge of the woodworking department at Nebraska State Teachers College.

Both men are graduates of Colorado State College of Education, Greeley, Colo.

L. H. ALBERTY RETIRES

Lumen Harvey Alberty, director of vocational education of the Lincoln, Neb., public schools, for the past 28 years, and prior to that head of the vocational department at Lincoln High School for three years, retired on June 30, 1957. Previously he had taught at Halstead and Winfield, Kans., where at both places, he built new industrial-arts shops.

Mr. Alberty was born in 1891 at Pittsburg, Kans. He studied engineering science at the University of Kansas, and received his B.Sc., degree from Kansas State Teachers College, Pittsburg, where he took work in the field of industrial arts. He received the M.Sc. degree from the University of Wisconsin, where he worked in the field of administration of vocational education.

Mr. Alberty has been active in various educational groups, having served as secretary-treasurer of the Nebraska Vocational Association, and as president of the Nebraska Industrial Educational Association. He was also on the executive council of the Nebraska Vocational Association for several terms, and is a member of the Nebraska Schoolmasters Club. He taught two summers at Iowa State College at Ames, Iowa.

Mr. Alberty compiled a book entitled "Lumber Tables" for the use of industrial-arts teachers.

PROFESSOR MONTGOMERY RETIRES

Wilson B. Montgomery has retired from his position as associate professor of industrial education at Mississippi State College, State College, Miss. During his tenure as a teacher, over a period of 43 years, he has taught woodwork and handicrafts to hundreds of potential vocational and industrial arts teachers. He and Mrs. Montgomery will make their home in Knoxville, Tenn.

Prof. Montgomery was graduated from Mississippi State College with a B.S. degree in electrical engineering. He earned his M.S. degree in industrial education at the University of Missouri.

DR. PRICE APPOINTED ASSISTANT DEAN

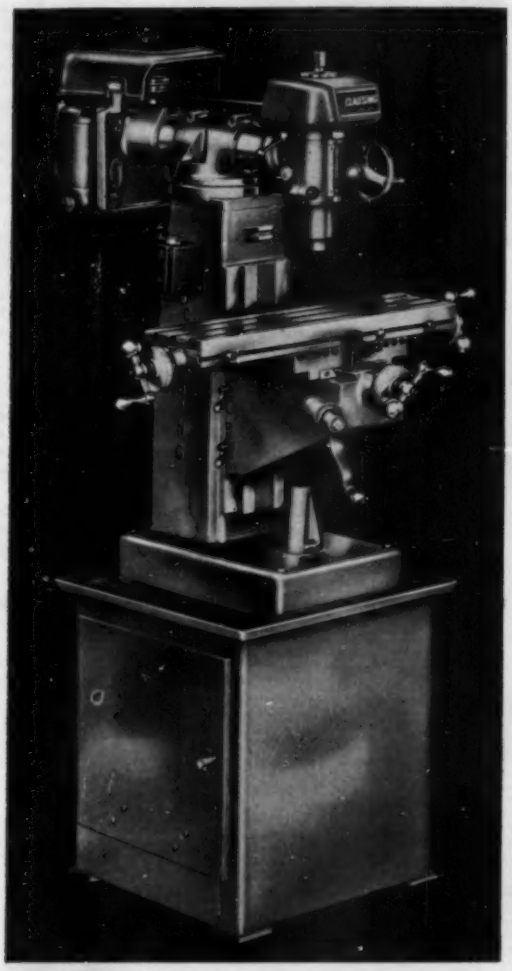
Dr. Robert D. Price has been appointed Assistant Dean and Director of Admissions of the Teachers College, Cincinnati, Ohio, effective September 1, 1957. Dr. Price will continue to offer graduate courses in his fields of specialization, but will devote the major portion of his time to the work of the undergraduate office.

Dr. Price joined the faculty of the Teachers College in 1950, with the rank of assistant professor, following completion of his doctoral program at the University of Minnesota. Since that time he has received two promotions, and he now holds the rank of professor of education. He has had administrative experience in the public schools of Minnesota and as Assistant Director of Demonstration Teaching in the Summer School of the University of Cincinnati.

(Continued on page 10A)

CLAUSING VERTICAL MILL

A RUGGED, VERSATILE MACHINE TOOL



INDISPENSABLE FOR MODERN SCHOOL SHOP TRAINING

You need this rugged, versatile CLAUSING VERTICAL MILL to teach *more* basic operations *better!* It's a machine that most industries now use for operations requiring exceptional sensitivity and accuracy. And this CLAUSING MILL will stand up under severest usage, no matter how inexperienced the operator. Amazingly versatile . . . spindle head can be swiveled in vertical plane, and set at any angle, and turret rotated in a horizontal plane, making it possible to mill, drill, bore, ream, and shape at all angles with one set-up. It is actually *several* precision machines in one. Saving in set-up time alone is an important factor for both teacher and student. Built to rigid tolerances for efficient operation, sustained accuracy, and long service life. 7 ball bearings in the CLAUSING heavy-duty drive. All feed screws have ground threads, turn on ball bearings. Table surfaces and dovetail ways on table, saddle, knee and column are precision ground.

MILLS, DRILLS, BORES, REAMS & SHAPES with Extreme Accuracy . . . at all angles . . . with one work set-up

Any number of advanced operations can be taught easily and quickly on this versatile multi-purpose machine. Your CLAUSING dealer will gladly show you this unusual machine and demonstrate its many desirable features. See him before you purchase any new equipment . . . mills, drills, or lathes.

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CLAUSING DIVISION

Atlas Press Company

Quality Machine Tools Since 1911

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PERSONAL NEWS

(Continued from page 8A)

ARCHITECT MIES HONORED

Ludwig Mies van der Rohe has been awarded Germany's highest honor in the fields of science and art.

The noted architect and director of the department of architecture at Illinois Institute of Technology, Chicago, has been named to the Order Pour la Merite. This Order was founded in 1740 by Frederick the Great.

Considered one of the leading exponents of contemporary architecture and design, Mr. Mies designed the master plan for Technology Center, the name given to Illinois Tech's campus on Chicago's near south side. He also designed the Seagram's building in New York City and the 26-story twin glass apartment buildings at 860 Lake Shore Drive, Chicago.

GERRITY NAMED DIRECTOR

Thomas W. Gerrity has been appointed Director of the Schools of Business of International Correspondence Schools, Scranton, Pa., by Lawrence W. Tice, ICS President.

Mr. Gerrity joined the International Correspondence Schools in September, 1953. In September, 1954, he was named Principal of the Business Schools.

NEW INSTRUCTORS APPOINTED

Ten new instructors have been appointed to the staff of Illinois Institute of Technology, Chicago, Ill., effective September 1.

They are Demetrios P. Kanellakos, electrical engineering; Julian Snyder, civil engineering; Robin A. D. Walker, architecture; and Tsih C. Wang, electrical engineering; Dr. Kenneth Merle Watson, chemical engineering; Ching-Wen Lee, mechanics; Dr. John W. Neuberger, mathematics; Petros N. Papas, electrical engineering; Dr. Robert J. Romagnoli, physics; and Dr. Swaminatha Sundaram, physics.

JEAN M. GALLAGHER NAMED PRINCIPAL

Jean M. Gallagher has been appointed Principal of the School of Art, International Correspondence Schools, Scranton, Pa., as announced by Lawrence W. Tice, ICS President.

Miss Gallagher joined ICS in June, 1953, as an instructor in the School of Engineering Drawing. In July, 1955, she was appointed chief instructor in the School of Art.

FRANKLIN KELLER HONORED

Dr. Franklin J. Keller, principal of Metropolitan Vocational High School, New York City, retired recently to become staff director of the Community Talent Search, National Scholarship Service and Fund for Negro Students.

At a testimonial luncheon held at the end of the school year, at the Hotel Plaza, 300 persons heard of his various pioneering activities.

According to assistant superintendent of schools, Philip Becker, Dr. Keller's efforts were largely instrumental in launching departments of printing, building trades, aviation trades, needle trades, food trades, maritime education, and the widely known High School of Performing Arts. These had evolved from dreams by Dr. Keller and have earned thousands of children to better citizens.

Dr. William Jansen, superintendent of schools, praised him as a writer, consultant, traveler, and administrator.

Dr. Keller hopes to continue his job of "finding talent," and hopes to make integration a "living" thing, rather than a subject to be talked about.

SIX TEACHERS RECEIVE AWARDS

At the 85th annual meeting of the Manufacturing Chemists' Association at White Sulphur Springs, W. Va., in June, six outstanding teachers in the field of undergraduate chemistry received awards of $1,000 each under the Association's 1957 College Chemistry Teacher Awards Program.

Recipients of the award, each of whom also received a medal and citation, were: Dr. Emil O. Ellingson, St. Olaf College, Northfield, Minn.; Dr. Ashley Robey, Roanoke College, Salem, Va.; Dr. Arthur F. Scott, Reed College, Portland, Ore.; Dr. Garrett W. Thiessen, Monmouth College, Monmouth, Ill.; Dr. John Turkevich, Princeton University, Princeton, N. J.; and Dr. Leo A. Yanowski, Fordham University, New York, N. Y. The six recipients were selected from among 158 candidates.

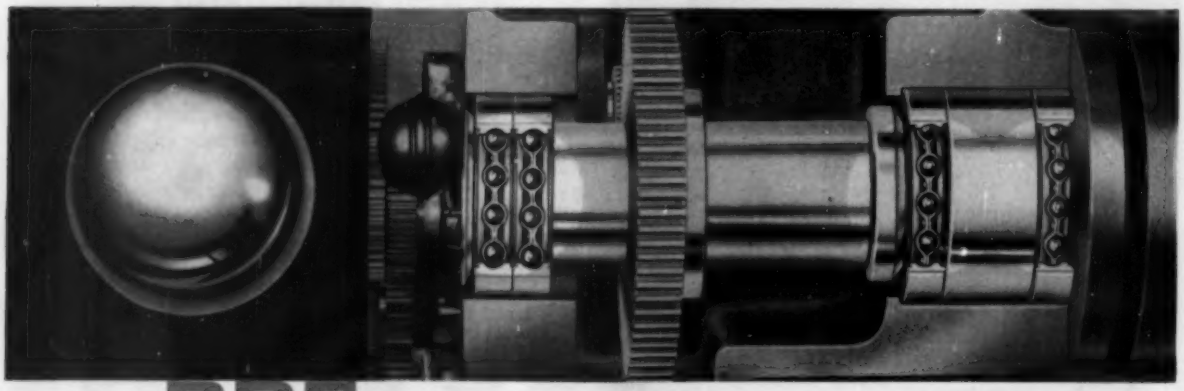
NEW FACULTY DEAN AT ICS

Dr. Robert A. Nottenburg, assistant dean of the faculty of International Correspondence Schools, Scranton, Pa., has been appointed dean of the ICS faculty, as announced by President Lawrence W. Tice.

Dr. Nottenburg, also Director of Educational Research at ICS, has been associated with the world's oldest and largest home-study school since 1953.

A native of Boston, Dr. Nottenburg is a graduate of Massachusetts State College with

(Continued on page 22A)



PRE-SET?

You bet! That's why Spindles on Logan Lathes need no bearing adjustment

Heavy or light loads, high or low speeds, the ball bearing spindle on a Logan Lathe is always ready to roll. You don't have to set it tight for one job, loose for another.

Why? Because the ball bearings in a Logan spindle are not only pre-loaded and grease-sealed—they're *pre-set* for precision accuracy over a wide speed range. Thus, original spindle accuracy is sustained *far* longer than usual with plain or tapered roller bearing mountings.

Logan's many quality features can be seen first-hand at your nearby Logan dealer. Catalog on request.

Look at a Logan before you leap

LOGAN ENGINEERING CO.

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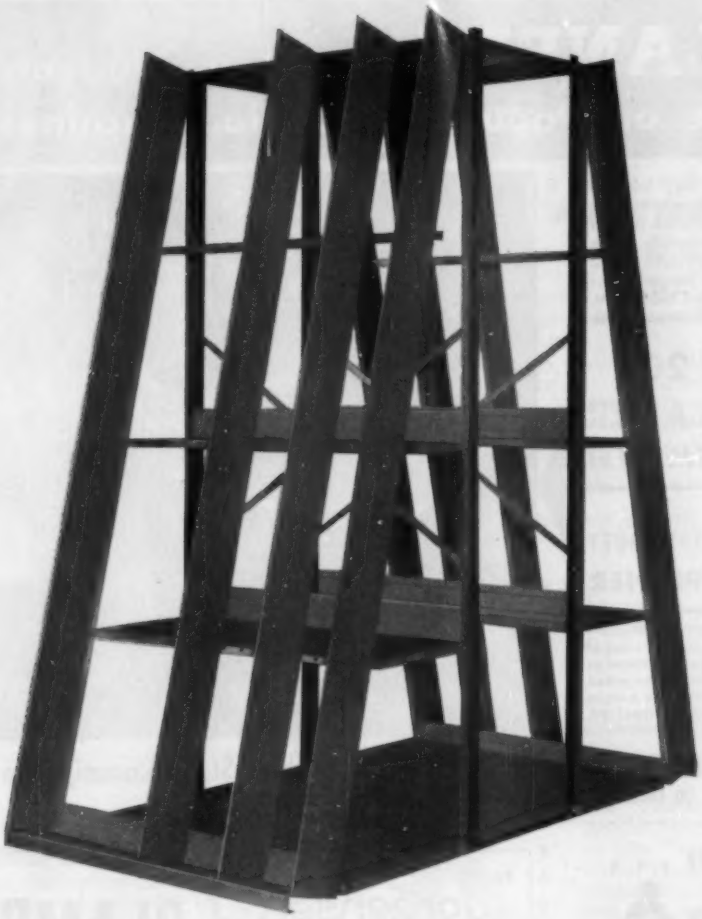

Vertical Lumber and Metal Storage Rack. Holds 12 to 14 ft. lengths of lumber, pipe, bar stock or conduit in the vertical compartments. Three shelves are provided for shorts. Base shelf is 24 in. deep, intermediate shelf 18 in., and top shelf 12 in. Triangular unit is 4 ft. wide, 34 in. deep at base. Rectangular plywood storage unit is 24 in. deep, holds sheets on 4 ft. edge.

Tool Storage Cabinets. Wall and floor types, with all-steel pegboards. Wall type has pegboard area of approximately 24 sq. ft., floor type approximately 65 sq. ft.

Apron and Book Racks. Provides space for aprons, books, etc., of 12 students. Each compartment is 12 in. deep, 12 in. wide, 9 in. high.

All the storage units you need in HALLOWELL School Shop Furniture

Need racks for storing current supplies of lumber, pipe, bar stock, conduit? Or steel pegboard cabinets for safely storing tools? Or cabinets for holding student projects? Or wardrobe cabinets for apparel? We make standard units of HALLOWELL School Shop Furniture for all these storage requirements. And they cost much less than custom-designed equipment.

Write for Bulletin 2246 today. It gives detailed information about the complete line of functional HALLOWELL units for outfitting industrial arts and vocational shops. Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 74, Pa.

Stain and Finish Cabinets. All-steel for safe storage of flammable materials. The base has one adjustable shelf, the upper cabinet two. Both base and upper cabinet are equipped with smooth-operating sliding doors.

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PARKS PLANERS Give Your Students Practical Experience on Popular Industrial Machines

Students learning on Parks Planers benefit not only from the safe, easy, and accurate operation of these planers, but also from the practical experience of working on the same type of high-speed, precision built planers they will eventually use in their trade. The Parks No. 20, 20" Planer (at right) has a 4-knife cutter-head with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M. or 40 and 80 F. P. M. Available with knife-grinding attachment at additional cost.

THE **PARKS** No. 20
20" Thickness PLANER
WITH KNIFE-GRINDING ATTACHMENT

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12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16". Both planers are priced low enough for even the most modest shop budget. WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.

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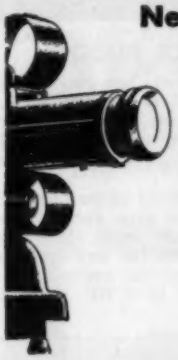
STANLEY SHOP TALK

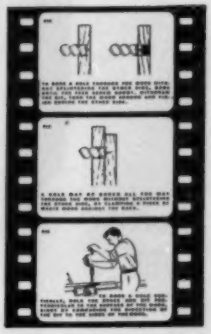
New series of film strips — *"Boring Tools for Woodworking"*



Another new visual aid series. This set covers boring tools such as hand drills, bit braces, bits, other tools and how to sharpen and use them.

Nine strips of 35mm. safety film in individual cans (151 frames in all) come packed in a storage box with a manual of suggested questions for testing.

FRAMES		FRAMES	
23	Types of Boring Tools	15	How To Use Hand and Breast Drills
11	Holding and Boring Tools and Accessories	16	How To Use Automatic Push Drills and Spiral Ratchet Screw Driver To Bore Holes
23	How To Bore A Hole	15	Boring Tools For Use in Electric Drills
15	How To Use The Doweling Jig	12	How To Sharpen Boring Tools
21	How To Use Expansive Bits, Forstner Bits, Brad Awls		



$5.00 per set, packed in a handy box, postpaid, with a booklet of suggested test questions. Use the coupon.

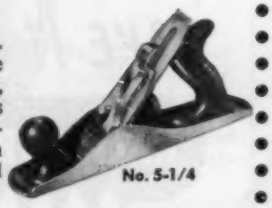
BLOCK PLANE

The Stanley "100 PLUS" No. 118. Here's an all steel, low angle plane that's really BOYPROOF. Only three pieces, and the locked-in cutter adjustment prevents thread stripping or lost parts.

No. 118

JUNIOR JACK PLANE

Stanley No. 5-1/4 Junior Jack. The ideal plane for boys at the junior high school level. Fast, clean cutting, easy to adjust, it's 11-1/2 inches of balanced performance with the usual high quality Stanley workmanship and materials.



No. 5-1/4

"YANKEE"® SPIRAL RATCHET DRIVER

No. 130A

The "Yankee" No. 130A with quick-return spring in handle. Saves time and muscle. Supplied with three sizes of bits. "Yankee" Spirals available in three sizes, two styles. To convert this versatile tool for other jobs, buy accessories listed here.

Bits, Drill Points, Countersink. Accessories available for "Yankee" No. 130A: Nos. 301, 302 and 303 — Phillips bits in three sizes. No. 309 — Adapter and 8 drill points. No. 3030 — Countersink.

ELECTRIC DRILLS

No. 24A	No. 112	No. 324	No. 235	No. 123
¼" capacity	½" capacity	¼" capacity	¼" capacity	½" capacity
Special Duty	Special Duty	Heavy Duty	Heavy Duty	Heavy Duty
1100 rpm full load	225 rpm full load	1100 rpm full load	1150 rpm full load	330 rpm full load

The right drill for every job from the lightest to the heaviest. Full details in new Electric Tool Catalog No. 57E. Use coupon.

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Machined 30x40" rib-reinforced table keeps true surface . . . standard T-slot extensions give *extra* cut-off capacity. Accurately-machined cast iron fence has double support, locks front and back in any position. Anti-kickback pawls on guard and splitter assures *maximum safety*. Saw tilts full 45°, 1 to 3 HP, single or three-phase motor.

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Achieve new beauty, inspire new ideas in woodworking with OLIVER Variety Shaper

The addition of this sturdy Shaper to your woodworking shop will open the door to new operations. It will permit new ideas to take form. The Oliver Shaper rabbets, grooves, flutes, routs and shapes with ease and accuracy. Cuts smoothly feeding stock to cutters with or against the grain. Finished dovetailed ways support the head unit. Offered with belt or motor-on-spindle drive. Write for Bulletin No. 285.

Oliver machines for school shops DO MORE . . .

Saw Benches	Jointers	Metal Spinning Lathes
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OLIVER MACHINERY COMPANY
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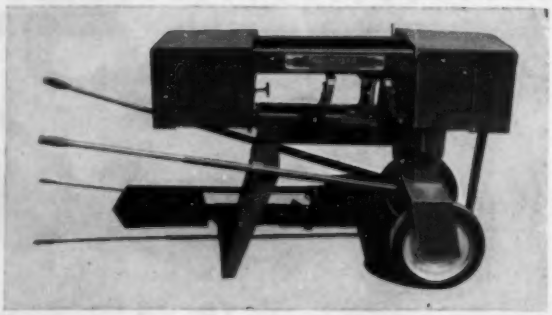
TAKE IT TO THE JOB...

KALAMOBILE

—a metal-cutting band saw that's truly portable—handier than ever!



Here's the popular Kalamazoo Model 610 metal-cutting band saw on the handiest chassis you ever saw. Provides greatly increased portability with its rubber-tired 12-inch wheels and telescoping handles. One man shifts the 610 from job to job with ease. Capacity 6" Rounds—10" Flat.

610-D without coolant attachment.
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Kalamobile chassis M6A fits all 610 models.

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BASIC TOOLS for SCHOOL SHOPS

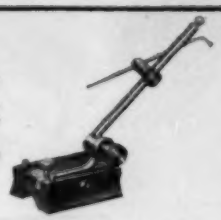
In your purchase of tools for your shop classes, buy for your boys the tools they will eventually buy for themselves . . . genuine STARRETT TOOLS. In the complete STARRETT line, there are tools for every purpose at prices that fit school shop budgets.

No. 436RL 0–1" micrometer with Satin Chrome Finish on sleeve and thimble, black enameled frame.

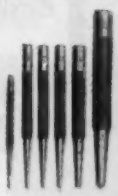
No. 224A-RL 2–6" micrometer with interchangeable anvils — a popular mike for automotive and metal-working classes.

No. 11 Combination Square with Center Head has easy-to-clean black wrinkle finish. Available in 4, 6, 9, 12-inch and larger sizes.

6, 12, 18 and 24-inch steel rules with Satin Chrome Finish (pioneered by Starrett). Flexible or spring tempered types, fractional or decimal graduations.



No. 56 Surface Gage for use on round work or flat surfaces has 2½" base, 4" or 7" spindle, gage pins in base, fine adjusting screw.



No. 117 Center Punches are hardened on both ends for safety and long life. Made with round shank, knurled grip, accurately centered tips.

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TRAIN YOUR STUDENTS WITH *Snap-on*

the "career" tools they'll use on the job

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Left: 5166-GS-B, an all-round set of 166 basic tools to handle hundreds of training problems. Includes all the items a young mechanic needs regularly in service work. Socket sizes range from 3/16" to 1¼" in ¼", ⅜" and ½" square drives. Boxockets 5/16" to 1¼", open ends 7/32" to 1".

Write for your copy of *Snap-on* Catalog "V" — a fact-packed book listing more than 4,000 hand and bench tools.

SNAP-ON TOOLS CORPORATION

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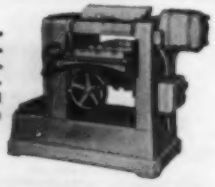
*Snap-on is the trademark of Snap-on Tools Corporation.

Easier to Teach–Easier to Learn with
WOODWORKING MACHINES *like these . . .*

NO. 4 VARIETY SAW—for variety sawing in any shop! Standard table 44" long and 36" wide, plus 19½" extension for carrying rip gauge table.

NO. 2 SURFACER—new, streamlined machine. Features simplified, mechanical design. Takes material 18" wide and from ⅛" to 8" thick.



HAND JOINTER—compact and accessible. Built in 8" and 12" width. Table 6'2" long, maximum rabbet depth 9/16". Round, 3 knife safety type cylinder head, 3 HP 3600 RPM motor.

SHAPER—1" diameter spindle, with 4½" vertical adjustment, 36" x 26" table, spindle speed–8,500 RPM, floor space—34" x 37".

BAND SAWS—machine 20" diameter wheel illustrated. Floor space 24" x 36", horizontal capacity 20", vertical capacity under guide 11". Also 27", 32", and 36" machines available.

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Catalog

Perfect for the school shop

RUGGED! ECONOMICAL!

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Queen City's new ⅓ H.P. Bench or Pedestal combination Grinder and Buffer fits all school shop requirements perfectly. Find out why Queen City Grinders have been used in vocational training for over 30 years. Available from ½ H.P. on up.

QUEEN CITY MACHINE TOOL COMPANY

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Pittsburgh COLOR DYNAMICS® plays an increasingly important part in improving productive efficiency

Skilled shopmen of tomorrow must know how to use this modern painting system to improve production and morale of workers.

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Many types of industries are using this painting method to improve working areas. Among these is the E. W. Ferry Screw Products, Inc., of Cleveland, Ohio, which produces more than a million and a half fasteners of many kinds for automotive, airplane and household appliance manufacturers.

Here focal colors are used on working parts of machines and eye-rest colors on stationary parts to help workers see their jobs better. Restful colors on walls and ceiling relieve eye strain and reduce physical fatigue. Safety colors to denote hazard areas lessen danger of accidents. This has contributed to better workmanship and better relations between management and workers.

Educators recognize that greater knowledge and more widespread use of this method of painting is making important contributions to the future productivity and welfare of employees.

If you want your students to be better equipped for tomorrow's tasks, begin now to teach them the principles of Pittsburgh's system of COLOR DYNAMICS. You can easily demonstrate its principles in a practical manner. Apply them in the decoration of your classrooms and equipment.

We'll be Glad to Make a FREE Color Plan for Your Classrooms

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
NOVEMBER 1957

Safety Contests Sponsored by the Industrial-Arts Department

JOHN HURLEY
Bureau of Vocational Activities
Brooklyn, N. Y.

In 1955, the industrial-arts department of Jr. H. S. 109, Brooklyn, sponsored a contest on fire prevention. All students in the school were eligible and could participate in any and all areas, namely: photography, essays, posters, and general (dioramas, models, 3-D representations), etc. Suitable awards were offered in each category. These awards were donated by community agencies, such as the American Handicrafts Company, the Tandy Leather Company, X-Acto Corporation, Germain School of Photography, and the school Parents' Association. This contest was tied in with an industrial-arts assembly program based upon a play on fire prevention obtained from the National Education Association.

During 1957, at the Simon Baruch Junior High School, 104, Manhattan, the industrial-arts department sponsored a safety contest. Students could submit entries in the same four categories above stated. The topic of this contest was very broad in order to give each student an opportunity to consider safety in all its aspects as it relates to him at home, in school, and in the community. As before, the community agencies were available for suitable prizes, such as a camera and flash unit, a two-year subscription to *Popular Science*, an introductory leather carving kit, and a trinket (enameling) kiln.

The results of this last contest were gratifying. Students submitted not only essays, but also numerous posters, dioramas, and photographs. The photograph included with this article indicates the quality of the posters, dioramas, and photographs.

The principal, Mr. Cherkis, followed through with a presentation of the awards in the assembly; and recog-

Student winners in the safety contest

A display of the posters, dioramas, and photographs submitted by students in the safety contest

nition of winners and honorable mention entrants with a short address over the school public-address system.

Contest reports and photographs submitted by Samuel R. Rubinstein, teacher of industrial arts.

Rubber Stamp Vulcanizing Press

ROBERT W. CYNAR
Supervisor of Industrial Arts
Board of Education
New York City, N. Y.

As a supervisor of industrial arts, I am constantly in search of new materials, ideas, and equipment which will enable our school shops to offer a better industrial-arts program to our pupils.

Eight years ago we have attempted to introduce rubber stamp making into the graphic-arts course of study. We procured several rubber stamp vulcanizing kits and distributed them to our teachers for experimentation. These kits used a powdered material, which when mixed with water, would serve as the molding material. Our teachers were successful in making a rubber stamp, although the process proved too difficult for junior high school pupils.

The recent introduction of small vulcanizing presses which use a bakelite matrix board as the molding material, was a constructive step in introducing this activity into the graphic-arts shops. However, we felt that the press was still too large for individual pupil use. In addition to which it was too expensive a piece of equipment that would be used as an enrichment activity.*

The idea of using a bakelite molding material was eagerly seized by several of our enterprising graphic-arts teachers and they set out to develop a vulcanizing press. This was accomplished by placing extension legs on a library standing press and placing a regular electric hot plate under the platen to provide the heat. Each pupil would set his type; the type was combined into one form; inverted linotype slugs served as bearers and the making of a stamp was in the form of a demonstration. The initiative of these teachers is commendable, however, the next step is to teach the pupils to make a rubber stamp as an individual project.

A new rubber stamp vulcanizing press, which costs less than half of other school vulcanizing presses has come to my attention recently. I believe that this press will be a boon to all graphic-arts teachers throughout the country and will enable them to introduce this interesting and practical activity into their shop program. At a recent demonstration it was enthusiastically received by a group of graphic-arts teachers. It is very regrettable therefore, that this enthusiasm will have to remain in check until the next requisition period.

The Warner model 4 by 6-in. rubber stamp vulcanizing press* is designed and accurately made. Its rugged construction will withstand the hard use which it will receive at the hands of junior high school pupils.

The over-all design of the press, Figure 1, provides compact arrangement of all controls for quick, easy operation. Construction is all metal, steel, and aluminum, finished in heatproof Grey Hammertone. Dimensions of dynamically balanced base, 8 by 12 by 1¾ in. high — platen area 4 by 6 in. — total height of press 8½ in. This equipment includes thermostatically controlled, electrically heated upper platen, full wiring to *on-off* switch, power and temperature control beacons, UL approved six foot power cord with molded rubber plug. Designed for use with any 110–120 volt a.c. current only. Floating toggle linkage pressure assembly to lower platen assembly alignment guided by press frame columns. Pressure control arm 12 in. long, with molded rubber hand grip.

Since the stationary upper platen provides the proper temperature required for full vulcanization of the matrix

*Warner Electric Co. Inc., Rubber Stamp Division, 1512 Jarvis Ave., Chicago 26, Ill.

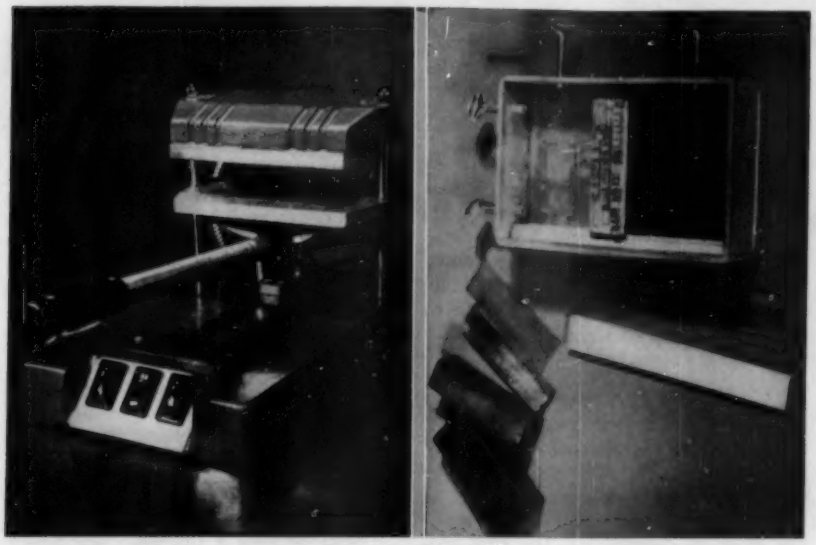


Fig. 1. Rubber stamp vulcanizing press. Fig. 2, at right: Chase used with the vulcanizing press

molding board and the rubber stamp, it is provided with an electrical heating element, in contact with the full surface of the platen for even heat distribution. The temperature of the upper platen is automatically controlled by a preadjusted automatically operating thermostat to maintain a constant 400 degrees during the entire vulcanizing cycle.

The chase, Figure 2, is a metal tray and has a working area of 3 by 5 in. It is equipped with hand tightening lockup screws for horizontal and vertical lockup. A metal rule should be used against the lockup screws so as not to damage the furniture. The most important feature of this chase is its two sided, reversible design. The deeper side, an exact inch in depth is the type assembly and matrix molding side. The shallow side, an exact .200 in. in depth, is used for making the rubber impression into the matrix.

What this means in actual use is that the bearers, on four sides of the chase, limit the closing of the press platens to produce an accurately controlled depth of the type impression in the matrix. And when the matrix is made the chase is reversed in the press and the depth of the rubber impression made into the matrix is also accurately controlled by the bearers when the press platens are closed. To someone accustomed to working with type, the idea of reversing the chase may seem impossible — but the type does not pi. because of the four lockup screws. It is impossible to damage the type, because the sides of the chase which act as bearers protect the type.

Using uniform pressure and exact bearer height for each step of the process assures identical type height in each and every rubber stamp or matrix produced, making it possible to even interchange type lines or mount impressions of zinc plates or electros made on one matrix to type lines made in another.

The intent of this brief article is not how to make a rubber stamp, because many articles have already appeared in this magazine as to the process. But rather to share a new piece of equipment with others teaching industrial arts.

In New York City we teach five basic areas in all the graphic arts shops: hand typesetting, presswork, bookbinding, linoleum block cutting, and cellulose acetate etching. For further enrichment of the activities one or more of the following activities are taught in various shops: silk screen printing, photography, paper making, lithography, marbleizing, envelope and rubber stamp making.

A Notable Shift in Leadership

WILLIAM THOMAS BAWDEN
Emeritus Professor
Kansas State Teachers College
Pittsburg, Kans.

Recently I looked through the printed programs of the annual conventions of two national organizations in our related fields of industrial arts and industrial education. Almost immediately I noted the names of men, complete strangers to me, who were given important assignments. This was, of course, nothing new or startling; but, as I went through the two programs, I was struck by the large number of unfamiliar names. Out of curiosity I checked over the pages, name by name, assignment by assignment. On the two programs I noted a total of 89 names, excluding a few duplications. These assignments included: making an address, reading a paper, serving as presiding officer, chairman of committee, leader of discussion, and others. To my astonishment, I found only 14 out of this total of 89 men who were recognized leaders only 12 years earlier.

On June 30, 1945, having reached the age set by the State Board of Regents, I stepped out as head of the Department of Industrial Education at Kansas State Teachers College. a.though I was not "retired" until six years later, in 1951. During the 12 years since 1945 I have not attended a single national or state convention, and consequently have been almost completely isolated from professional affairs. Before 1945 I was quite active in organizations of teachers and administrators, and for many years held positions that afforded me unusual opportunities for wide acquaintance among the leaders in industrial arts and industrial education.

It may be admitted that program as-

signments, even at national conventions, do not constitute a reliable criterion of leadership, and that one person's memory after the lapse of 12 years may be an uncertain foundation upon which to base conclusions. Further, the programs of two conventions do not begin to exhaust the supply of national leaders; in fact, they do little more than to sample those who are personally known to members of the program committee, or who may be thought to be available.

Nevertheless, I could not escape the conviction, as I ran through these names, that something very significant is happening. Even if the figures I have given are liberally discounted, something very remarkable has taken place in 12 years to bring about such a complete shift in the personnel of those who have achieved sufficient recognition for their leadership qualifications to be selected for important assignments on the programs of national conventions.

Tentative Conclusions

However unreliable or incomplete the facts may be, and however tenuous or uncertain the relationships, it seems to me that certain suggestive considerations emerge, which may properly be put forth, at least as tentative conclusions, worthy of attention.

1. In the first place, it seems unmistakable that a phenomenal turnover has been, and perhaps still is, taking place among the recognized leaders in our fields. There may be some who will suggest that many of the former leaders have talked themselves out, and have little to contribute that is new or significant. It may be also that the past 12 years have seen an unprecedented number of resignations, retirements, and deaths. I have no way of knowing. Whatever the explanations, the fact remains that the names of a considerable number of capable and respected leaders have disappeared from the limelight, at least so far as these two conventions are concerned.

2. It has been suggested that during World War II a considerable number of teachers and administrators left the schools and colleges to enter the armed forces, and to take over responsible positions in industry and business, and that many of these men did not return to the schools after the cessation of hostilities. I know of no easy way to assess the impact of these changes upon the total situation.

3. It seems certain, in view of the changes suggested above, and in view of the increases in enrollments and offerings, that there have been, during these 12 years, many opportunities for promotion for men who were ready. This would account, then, for the emergence of many men who had not achieved national recognition prior to 1945.

4. The known facts undoubtedly justify the encouragement of the younger generation of teachers to expect increased opportunities for advancement in the future. Emphasis should be given to the importance of being prepared for these opportunities before they arise. To be selected for promotion or advancement it is imperative that the individual become known for his knowledge, his skills, his achievements, his devotion, and his loyalty to the organization or the institution with which he is connected.

How to Become Known

For the benefit of younger men it may be pertinent to consider some of the steps that can or should be taken by young men in the early stages of their careers who are ambitious to make the most of themselves. The first requisite, clearly, is to become well and favorably known to as large a number as possible of one's colleagues. It is not always possible to know who they are, but there are always and invariably certain individuals who are called upon for recommendations, by those who are in position to make the appointments and the promotions.

Here are some of the obvious ways in which to become known:

Attendance at summer school, or extension classes, and the extension of one's acquaintance, so far as these experiences permit.

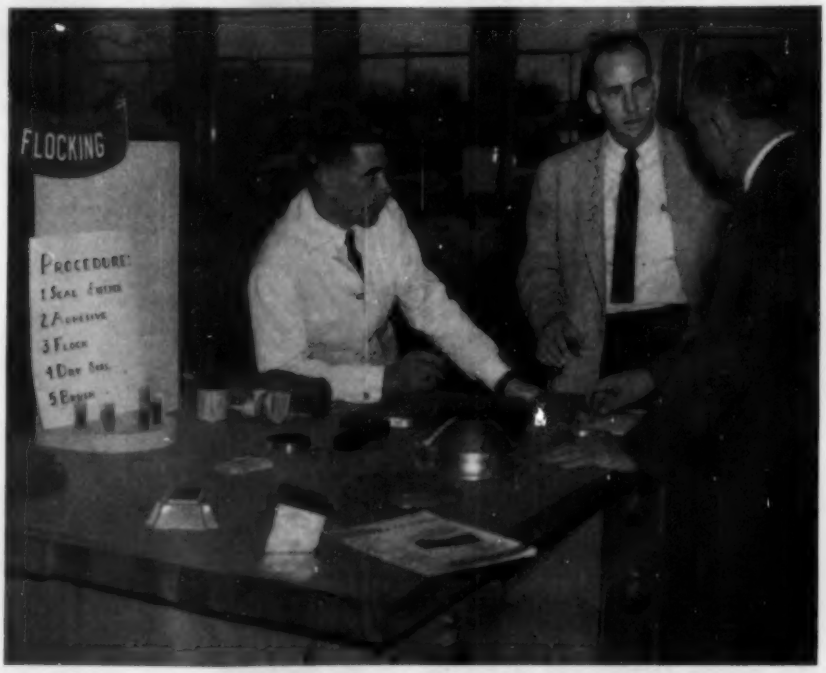
Attendance at professional conferences and conventions of teachers.

Participation in programs, and having something worth while to contribute. The approved procedure is, not to volunteer, or to solicit invitations, to read a paper, or to serve as chairman of a committee, but to begin by taking some part in the informal discussion which is frequently provided at the close of a session. By studying the topics announced in the advance program, it should be possible to prepare ahead of time to add something worth while to what others may have to say.

Contributions to the professional magazines.

After serving a thorough apprenticeship in writing and speaking, and after acquiring the necessary background of successful experience and achievement, authorship of a report, pamphlet, or book will attract favorable attention.

The field is broad, the problems are endless in number and variety, the competition is keen; consequently, successes are not achieved easily or quickly. The opening of another new school year should be a challenge!



Left to right are Robert Berry and James Stewart, Ball State Teachers College senior students, who are shown demonstrating flocking technique and how flocking can be used on various materials

— Submitted by Bernard R. Josif, department of industrial arts, Ball State Teachers College, Muncie, Ind.

A Program in Manual Arts Therapy

ROBERT E. SMITH
Professor of Industrial Education
Southern Illinois University
Carbondale, Ill.

The department of industrial education at Southern Illinois University has developed a four-year program of manual arts therapy to be offered to interested students beginning with the autumn quarter of 1957. The program is designed to prepare graduates for the position of manual arts therapists in hospitals. Manual arts therapy is designed to supplement both physical and occupational therapy.

Over a period of years programs leading to a degree in either physical or occupational therapy, have been offered by a number of universities and colleges. Manual arts therapy does not claim to be an entity in itself, but rather a development needed to supplement other forms of therapy. In practice both physical and manual arts therapy may be administered to a patient concurrently or in close proximity with respect to timing. For example, a patient may have injured an arm to the extent that he cannot raise it or move his fingers to grasp a desired object. To aid him overcome his handicap, the physical therapist has him perform repeatedly certain exercises designed to revitalize the injured muscles. Persistent practice slowly brings about improvement. But being a slow process, it frequently is difficult for the patient to see that he is making progress. Under such circumstances, he often is definitely discouraged and perhaps despondent. If the treatment is supplemented through the use of a tool in the performance of an operation, the patient is able to see that he has made progress and has experienced success which gives him an uplift in morale, and, in addition the satisfaction of having accomplished an assigned task. A typical example would be having succeeded in setting one or more lines of type used, for example, in printing a calling card. Another example might well be experience and success in designing an object which he looks forward to constructing in the hospital shop or activity room as soon as he can get a little better control of his larger muscles. Designing an object, making a working drawing or a house plan is an activity which the patient may be able to undertake while most of the time still confined to his bed or in a wheelchair.

The psychological uplift and stimulus the patient gets from his successes in the manual arts therapy program not only supplement the physical therapy he is receiving, but may even greatly enhance such benefits. In many cases, the most serious factor conditioning recovery is a feeling of frustration, a fear he will not again be able to participate normally in social activities and enterprises. Still more debilitating is the fear that he will not be able again to participate in an occupational life which heretofore had enabled him to earn a living for himself and his family and to make a significant contribution to social well-being. To help the patient overcome his despondent fears and help him build faith in himself is the task of the manual arts therapist. Manual arts therapy above all strives to aid the patient develop self-confidence and self-reliance. These are attributes essential to mental well-being, occupational satisfaction and success, and social acceptance.

To achieve the preceding essentials the developed curriculum provides for pertinent experiences in psychology, sociology, and life science. These are designed to acquaint the student therapist with the psychological nature of man, his inner dynamics, motives, desires, personality development, and adjustments to his fellow beings; his growth and general development from childhood to maturity, to senility and finally, how to cope with problems incident thereto. Specific experience will deal with procedures designed to acquaint the student with ways and means of detecting and evaluating evidence of development of undesirable personal and social attitudes, habits and reactions, also with ways and means of bringing about changes beneficial to both the individual and society. Studies in sociology are designed to acquaint the novice therapist with concepts of personal integration and social adjustment; the emotional aspects of human behavior with their consequent potential for good or ill personally and socially. Opportunities will be provided to study social problems arising through mental illness, vices, personal and group disorganization. Work in sociology not only promotes social understanding but emphasizes the values accruing from one's sensitivity to his personal and social responsibilities in a dynamic and evolving social industrial environment. Work in the life science, physiology and zoology, provides both opportunity and occasion to study the contributions of these sciences to knowledge and an understanding of the character and function of bone structure, joints, muscles, and the nervous system of human beings. Experiences in zoology provide knowledge of the principles of animal biology, the basic organization of matter into cells, tissue, organs, and systems. Study in this science will bring into focus the influences of heredity and the mutual relations between organisms and their environment.

To help students interested in becoming effective practitioners, Southern Illinois University has developed a program designed to aid candidates develop the skills, knowledge, attitudes, and abilities essential for competence in manual arts therapy. An attribute essential to success as a manual arts therapist is resourcefulness. To achieve significant results the therapist must

be versatile in his approach to the patient, in the use of equipment at his command and in his methods of instruction. Particularly he must keep in mind that individuals differ in many ways. Such being the situation, he must recognize that procedures used in one case may, and likely will not, be effective in another. A sharply spoken directive may profoundly discourage one patient and have an entirely different effect upon another. For effective achievement and attainment of desired results the individualization of instruction, the personal approach and appeal are essential.

The program at Southern provides for a broad general education and training, also opportunity for specializations at the option of the students. Some options are:

Arts and Crafts: This option includes work in basketry, ceramics, metalcraft, plastics, leather, and printing.

Graphic Arts: This option includes bookbinding, design, freehand and mechanical drawing, commercial art, photography, silkscreen, and linoleum block printing.

Electricity: Experiences are provided in development of circuits, construction of simple electrical devices, radio and television, appliance care and repair.

Metalworking: In this option the student has experience working with various metals, including aluminum, copper, iron, mild steel in various forms, tool steel, machining of metal, and use of precision instruments.

Woodworking: In this option the student has experience in cabinetmaking, furniture making and repair, patternmaking, wood finishing, wood turning, and upholstering.

Agriculture: This option involves experience in animal husbandry, growing and harvesting of fruit crops, vegetable gardening, elementary poultry production, soil conservation, implement repair.

Hospital Work: There will be work around the hospital in which the patient may participate. For example, simple carpentry, plumbing, general repairs, and gardening.

The General Option: This may be any combination of the various options or even parts of specific options mentioned above, depending upon the student's interests, needs, and abilities.

The curriculum as evolved, provides basic training in three or more of the options listed above. These, too, may be selected in accord with the student's interest and ability. The major consists of courses selected from the offerings of the Department of Industrial Education, supplemented by one or two courses offered in the department of fine arts. The major consists of sixty-four quarter hours taken from the above sources. The curriculum lists sufficient required courses in psychology to constitute a twenty-four hour minor in that subject.

An outstanding feature of the program is a twelve hour internship to be served in selected hospitals. This internship will be offered under the supervision of a qualified manual arts therapist in the summer quarter following completion of the third and fourth years' work.

By a careful selection of options and electives, a student may be able to qualify for teaching industrial arts in secondary schools, after pursuing the manual arts therapy curriculum to a successful conclusion.

Drafting Machine Training in the School

ROBERT A. GOULDER
Cleveland, Ohio

Business and governmental statisticians predict that during the next twenty years, engineering and technical developments will be as revolutionary as they have been during the past fifty years. Even the most conservative predictions of new technical advances to come are staggering to the imagination!

Every plan and detail of these new developments must first be worked out on the drafting boards of industry. Thus, the foreseeable future for our young draftsmen, engineers, and scientists, is brighter than ever before.

Recognizing this need for trained engineers and draftsmen, increasing numbers of schools and colleges are installing drafting machines for student training in their mechanical drafting rooms.

Until the past few years, little attention had been given to modern drafting equipment in school courses and texts. The tendency had been to teach merely the rudimentary tools, such as the T-square and triangle, and then, perhaps, make just a brief mention to the effect that drafting machines also are available. New textbook editions, however, are now correcting this omission.

For hundreds of years, mechanical drawing lines were made with the familiar T square and triangle, and it was not until after the turn of the twentieth century that a better means was devised. But in 1901, Charles H. Little of Cleveland, Ohio, invented the first drafting machine utilizing current principles. Since then, the drafting machine has all but supplanted the T square and triangle in industrial drafting rooms.

Essentially, the drafting machine consists of three basic elements: a parallel motion arm, an adjustable protractor head, and a pair of scales attached to the protractor head, one normally extending horizontally and the other vertically.

A survey conducted by Stratford High School in Stratford, Conn., and published in the May, 1955 issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION revealed that 76 per cent of the industrial-drafting departments questioned, use drafting machines for their design work. Sixty-three per cent of these industrial concerns use the drafting machine *exclusively*, while only 2 per cent use T squares.

Drafting machines in the drafting room at Tyler Junior College, Tyler, Texas. Forest Griffin, head of vocational education. Jack Betts, instructor

— Photographs by Jay Oistad & Associates, Tyler, Texas

Thus, the drafting machine today has become the overwhelming choice of industry.

Why Industry Wants School Training on the Drafting Machine

Industry has recognized the importance and need for effective school training on the drafting machine and has urgently requested it. Although many educators feel that drafting should be taught with the so-called basic tools (T square and triangle), and that students can readily pick up the use of the drafting machine in industry, conferences with engineers and chief draftsmen from the nation's leading industrial drafting departments voiced their strong desire that the proper use of drafting machines should be taught in the schools and colleges . . . where proper student training habits can be developed. It is a sad commentary that today, most draftsmen in industry do *not* properly understand the technique of the drafting machine and its tremendous time-saving potential. And few of our professional engineers and draftsmen have ever been actually trained in its use. Draftsmen do not "automatically" know how to use a drafting machine properly any more than skilled shop men "automatically" know how to use a turret lathe. The result is that most draftsmen fail to achieve anything like the proficiency they could attain following careful instruction and practice.

Virtually every industrial-drafting department head interviewed felt that the efficiency of the draftsmen in his department was considerably impaired by insufficient understanding of the use, operation, and adjustment of their drafting machines. Constant teaching of the T square and triangles in early life formed mental and physical habits detrimental to their efficient use of the drafting machine. For example, many draftsmen continue to use a triangle as a vertical rule with the horizontal scale of the drafting machine, completely overlooking the vertical drafting machine scale, thereby lowering the value potential of the drafting machine up to 50 per cent.

Industry also feels that the proper training of students on the drafting machine would result in substantially increasing drafting room production and reducing downtime, through a better understanding of the machine itself and its simple adjustments.

Here are a few quotations from letters received from various industrial drafting department heads. (Firm names upon request.)

Drafting machines are used in our engineering department but the organization does not benefit as much as is possible from them. Many people do not know how to get the most out of a drafting machine. . . . Are there any drafting machine training courses that we could send some of our people to?

Drafting today with the use of a tee square and triangle versus a drafting machine is as outmoded as driving a horse and buggy instead of an automobile. Industry utilizes the drafting machine today in practically all layout, design, and detail work. The results are faster and more accurate work. Because the drafting machine is now in common use in industry, it seems to me that it certainly should have a place in the elementary training period of a draftsman or an engineer. Therefore I agree that all schools, universities or colleges teaching the vocation of drafting be equipped to teach or demonstrate with the latest drafting equipment, the most important of which is the drafting machine. This will enable the student to learn to use it, adjust it and most of all, take care of it as a precision instrument.

The schools which teach mechanical drawing should have drafting machines available for the student to practice on and also . . . there should be a course of instruction on the use of the machine as well as the methods for adjusting the machine when necessary.

I believe that knowledge of the drafting machine is an extra dimension for the job applicant. If he is familiar with its adjustments and purposes, he just has that added something that could be missing when applicants are considered.

. . . a training period in the use of the drafting machine should be inaugurated in all schools teaching the fundamentals of drafting and engineering. This orientation might consist of the proper installation, various adjustments, and maintenance of this machine, together with the benefits to be gained through its use in presenting an efficient drawing.

Results of School Use

A teacher now using drafting machines in his classes reports, "we noted immediately an improvement in the class work performed by the students using drafting machines. The conventional T square and triangle are now used only as auxiliary tools to acquaint the student with this method which may still be found in some drafting rooms."

T. Edison Bullard, director of Kilgore College, reports that a study on the use of drafting machines in his classes revealed the following: (1) The drafting machines developed a professional atmosphere among the students. (2) Students felt that industrial situations were simulated in the classroom. (3) Neater drawings were made. (4) Improved accuracy resulted. (5) Students completed more drawings. (6) Classroom equipment noise was reduced. (7) Prospective employers were impressed with the equipment used for training.

Why Industry Prefers the Drafting Machine

Industry prefers the drafting machine over the T square, triangle, or parallel rule because drafting machines speed and simplify their design and drawing work. Drafting machines eliminate waste motion and the distraction of locating and positioning several different drawing tools. Drafting machines save up to 50 per cent of drawing time, lowering industry's costs and increasing the design productivity of the

Drafting machines at Lakewood High School, Lakewood, Ohio. Glenn Scott, instructor. At right — Drafting machines in use at Kilgore College drafting room, Kilgore, Texas. T. Edison Bullard, director, division of technical and vocational training

drafting room and the quality of work accomplished.

The use of drafting machines improves the draftsman's accuracy, reduces fatigue, and frees his mind and hands to think and draw. But the drafting machine does all this *only* when it is properly used. And that is a major reason why proper school training is so essential. The mental approach and drafting habits of the draftsman, molded during his school training, are of prime importance. Constant use of the T square and triangle develops slower methods of "thinking and drawing by construction." These habits are then carried over into industry. The tremendous work-saving and time-saving advantages of "direct drawing" — *only possible* with the drafting machine — are never realized.

A great many of the construction lines used when drawing with T square and triangle can be eliminated altogether. Many others can be drawn to exact lengths with consequent reductions in erasures, and finally, most lines of a figure can be drawn to exact length and correct weight the first time, eliminating the time-consuming operation of re-drawing to achieve proper weight and appearance. Thus, the chief advantages to the user are less construction, less erasure, less redrawing, and less time.

When students are trained on the drafting machine, their natural thought habits are developed to take advantage of direct drawing and direct thinking. Students are trained to begin drawing a figure directly to the proper weight and scale with a minimum of construction, and with the mental feeling that the view will be complete when all the lines are drawn. When *this* mental approach is used, it is truly surprising how much faster the pure mechanics of drawing are on the drafting machine.

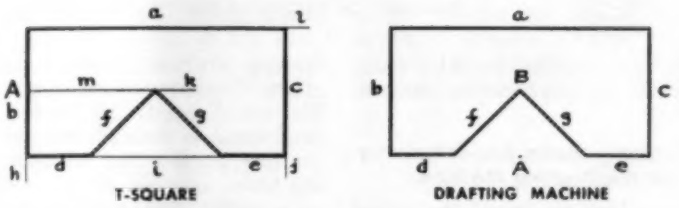


Fig. 1. Example A, showing drawings made with a T-square, and example B with a drafting machine

The first efforts in training and practice on the drafting machine should be toward acquiring the most direct and simple approach. Complete drawings should be made and analyzed to eliminate every unnecessary movement. Direct habits will then take hold, and the student draftsman will automatically choose the direct approach.

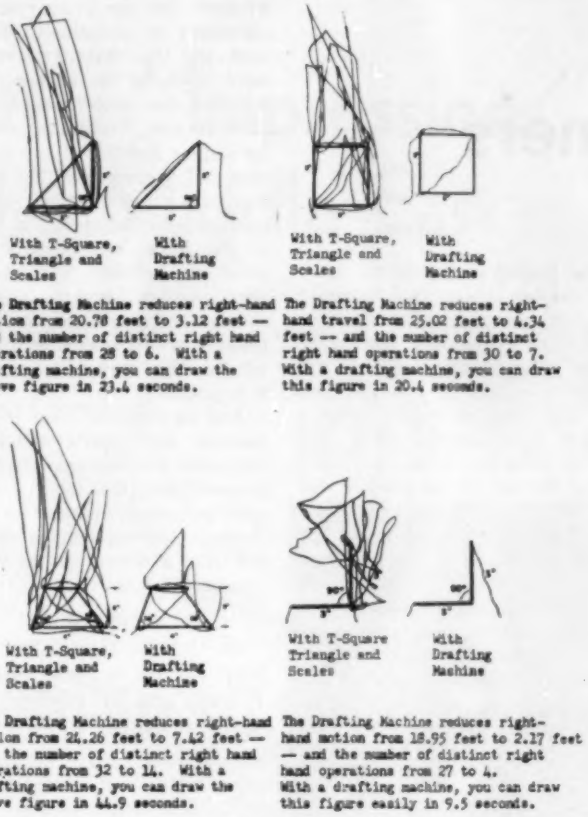
Frequently teachers express the belief that drafting should be taught using the T square first because it is the basic method, but it actually is no longer the basic method, and the bad habits taught do more harm than good.

A brief study of this example will illustrate the difference between "drawing by construction" and "direct drawing" with the drafting machine.

The view at the left represents the constructing of a plan view of a simple *V* block with the T square and triangles, while the view at the right represents the same view drawn with a drafting machine. It should be noted that the view actually favors the T square and triangle because only the right angle and 45 deg. angle of one triangle is involved, so that there is no shuffling of the protractor and the usual two triangles. Also, the exceptional speed and accuracy of the drafting machine on all nonstandard angles is ignored.

With the T square, the draftsman starts with the knowledge that he must first construct the lines of the figure, then measure the dimensions of the figure, then erase the overlong construction lines, and finally draw the lines to the proper weight and appearance, the final lines of the figure.

First, he draws line *a* longer than will be needed in the finished drawing. Then rearranges his tools to draw line *b*, also excessively long. He then must locate and place his scale to measure the true length of *a*, and from this point drop line *c*, again intentionally exceeding the known length. He must also separately measure the true length of *b* and from this point, draw the construction line, *d*, *i*, *e*, to intersect line *c*. Again, picking up the scale, he must now place it to measure the true lengths of *d* and *e*, and also locate the point *A*, indicating the height of the apex of the 90° "V." He then draws the construction line *m* over past the midpoint of the figure so as to locate the height of the apex when he draws the sides of the "V." Now with his 45° triangle, he draws in *f* and *g*, lightly, to intersect on the construction line *m*. Now he must erase excess construction lines *h*, *i*, *j*, *k*, *l*, and *m*, and redraw entire figure to correct weight of line.


With T-Square, Triangle and Scales
With Drafting Machine
With T-Square, Triangle and Scales
With Drafting Machine
With T-Square, Triangle and Scales
With Drafting Machine
With T-Square Triangle and Scales
With Drafting Machine

The Drafting Machine reduces right-hand motion from 20.78 feet to 3.12 feet — and the number of distinct right hand operations from 28 to 6. With a drafting machine, you can draw the above figure in 23.4 seconds.

The Drafting Machine reduces right-hand travel from 25.02 feet to 4.34 feet — and the number of distinct right hand operations from 30 to 7. With a drafting machine, you can draw this figure in 20.4 seconds.

The Drafting Machine reduces right-hand motion from 24.26 feet to 7.42 feet — and the number of distinct right hand operations from 32 to 14. With a drafting machine, you can draw the above figure in 44.9 seconds.

The Drafting Machine reduces right-hand motion from 18.95 feet to 2.17 feet — and the number of distinct right hand operations from 27 to 4. With a drafting machine, you can draw this figure easily in 9.5 seconds.

Pantographic studies. Advantages of drawing with drafting machines, compared to using old-style methods: T-squares or parallel rules, triangles, loose scales and protractor. (Pantographic studies of right-hand motion required to draw the figures diagrammed)

Now consider the same figure at the right as drawn, *not constructed*, with the drafting machine.

First, line *a* is drawn to correct length and weight, then line *b* is drawn to correct length and weight, then *c* and finally *d* and *e*. At the same time, the construction point *A* is pointed off. Then point *B* is pointed off. The left hand now quickly indexes the protractor to 45°, line *f* is drawn to proper scale and weight on the horizontal scale and line *g* is similarly drawn using the vertical scale. Point *A* is now erased if no center line is to be added.

The figure is complete as drawn the first time, accurate and finished in appearance. It only takes half as long to draw when the drafting machine is used! This example is typical of the time and work savings possible only with a drafting machine. Also shown are various pantographic studies of right hand motion required to draw the figures diagrammed. In each example, the figure at the left was drawn with T-square, triangle and scales — while the one at the right was drawn with a drafting machine.

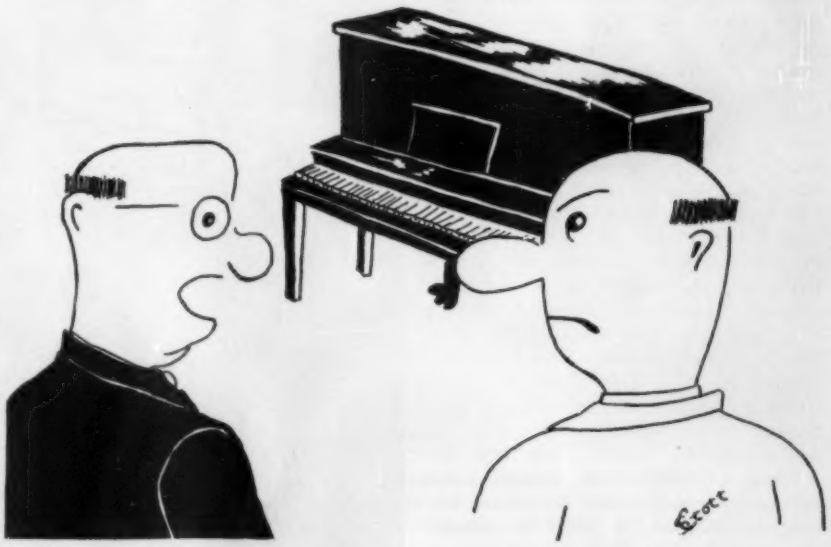
Conclusion

Direct drawing and direct thinking can best be accomplished through correct training and practice in the school. Until just recently, three factors have mainly been responsible for the comparative lack of drafting machine instruction in our schools.

1. *The belief that instruction was not necessary as students could readily learn the drafting machine at their first job.* Today, industry itself recognizes the need for school training and urgently requests it.
2. *The lack of good equipment at school prices.* This has recently been remedied with the introduction of school-size units, moderately priced, yet retaining all of the professional features and quality.
3. *The lack of proper instructional material.* This too has recently been remedied with the publication of a drafting machine training manual to provide teachers with at least the minimum of information needed for formal instruction. The booklet instructs students and teachers on how to use the drafting machine, adjust it properly and take proper care of it. No changes are required in present mechanical drafting texts or problems taught, nor is there any conflict with current mechanical drafting curricula.

Separate editions are available for instructor and for student use, and introductory copies are available without charge to teachers upon request.*

**Drafting Machine Practice*, a technical publication of Universal Drafting Machine Corporation, 7960 Lorain Avenue, Cleveland 2, Ohio.



"Have one of your boys fix it when they're free — I might add, the school paid $1500 for that piano."

— Calvin T. Stott, industrial arts department, Hanover High School, Hanover, Pa.

Teen-Age Planners

CLARENCE CULLIMORE
Architect, Fellow of the American Institute of Architects
Bakersfield, Calif.

"This is the greatest moment of my life!" declared the 17-year-old youth who won an outstanding accomplishment award in architecture. The award was provided by a national industrial-arts competition for high school students. It was not so much the five-day expense-paid trip to a leading automobile plant in the Midwest that elated this California youth as it was the satisfaction of having created something in the area that he liked best, that was judged superior to any of the several hundred other entries from the 48 states, Alaska, and the Hawaiian Islands.

It is heartening that our schools, in their zeal to stimulate underprivileged and backward youth, do not neglect their gifted students. Surely our American tenet visions the nurturing of the talents of the superior among our young people. The fullest flowering of their creative efforts presages a richer harvest.

Many teen-agers feel the creative urge to try their ability in architectural design. In our larger high schools these students are screened from the mill run in architectural drawing classes and given an opportunity, under competent tutelage, to show their fitness to pursue the profession of architecture. They have previously been advised that to become an architect is a long process. In most states it requires five years of college training in an approved architectural school and two years of additional work in a licensed architect's office before a candidate is privileged to take the rigid examination given for certification. Even after those hurdles have been scaled, the landing of the first architectural job is no easy matter.

Our schools are wise in setting up procedures to give special attention to the high-intelligence students. One way this is done for architectural students is by conducting appropriately supervised student competitions, in which the winners are awarded prizes. Such contests may be sponsored by the schools or by business establishments or fraternal organizations in the community. In one school I know of, a student project of this nature, sponsored by a chapter of a national fraternity and offering an aggregate of $100 in prizes brought out thirty contestants, who learned considerable about architecture that was not to be found between the covers of their textbook. Their program was to design a contemporary three-bedroom house with a view of the mountains on one side and a panorama of the city on the other. It was stipulated that the structure be but one story and of wood-frame construction and the cost was not to exceed $16,000.

Preliminary sketches of such a study brought out the facts that in order to amplify outdoor living space the house should have a minimum setback from the street, that the garage location should be adjacent to the house and of easy access to the main and rear entrances. It was determined that the living room might best capitalize on accessibility to the living yard, and that there were certain advantages in having the kitchen near the carport and also near the outdoor living and barbeque area. Preliminary drawings called for display sketches of the floor plan, plot plan, and a perspective. The working drawings were drawn in pencil on tracing vellum, ready for blueprinting. A scale model of the house was constructed of balsa wood and celluloid, and landscaped with green sawdust for grass, and sponges cut to represent trees and shrubs. The contestants gladly worked extra hours; they felt that they were putting emphasis where it belonged.

And so it would seem that local competitions may vastly stimulate youthful craftsmen and teen-age embryo architects. It would seem that this is a proper way to provide special impetus for the superior students contemplating architecture, who will play a major part in the future development of America.

On October 1, 1930, the flight record from Detroit to New York was set at 2 hours and 41 minutes. — *Wisconsin Military District.*

Instructor and student winner of a first place award in national competition, viewing the winning award

Printing "Impressions" of the Middle East

DR. THOMAS S. WEIR*
Professor of Graphic Arts
Santa Barbara College
University of California
Santa Barbara, Calif.

My friend Choaib Derbi told me when I first came to Beirut, Lebanon, that "in every hole in the wall there is a print shop."

After many months of poking my head in holes in walls I am inclined to believe him. In this Middle East metropolis of a half million inhabitants there are, if no holes have been overlooked, 300 "print shops." And the term print shop is probably a masterpiece of overstatement, in that any museum-piece press and a case or two of type qualifies.

Competition and mass production have not yet squeezed out the manual one-man shop — which holds true for all trades and crafts. Only a half dozen shops exist which the average Western printer would consider worthy of the name, and of these one is operated by an American Firm, one by the Jesuit Order, and one by the Adventist Church.

But things promise to change radically in the near future. Modern machinery is being imported at a rapid pace and a number of schools are introducing courses in printing (with the assistance of technicians provided by the American Point 4 program) which will be a decided improvement on the present "blind leading the blind" apprenticeship system.

Printing came to Lebanon and the Middle East when Abdullah Zakhir established the first press at St. John's Monastery at Dhour Schweir in 1722 to help the monks disseminate Catholicism in Syria. Although no printing has been done at St. John's since 1899, the shop has been kept intact by the fathers and the original cases and types remain well preserved. The early punches, dies, molds, ink-making apparatus, and presses are all as they were left when printing ceased 58 years ago.

The equipment, including the wooden screw-type press, was constructed in a manner similar to that which was popular in Europe during the same period. A considerable number of books from this press remain in the monastery library, along with the skulls of Zakhir and his assistant, which are neatly mounted for display. Other early presses

A — This 91-year-old press produces a Braille-like impression . . . which is removed (somewhat) by the pressure of this equally ancient press shown at D

B — The first press and other implements employed by Abdullah Zakhir in 1722 are displayed in St. John's Monastery

C — Early version of a paper cutter found in the St. John Monastery museum

D — See A (above)

E — Two pages of type for the next edition of one of Beirut's 30 newspapers get a "piggyback" ride to the press — down three flights of stairs

*Dr. Thomas S. Weir returned recently from a two-year assignment for the Department of State in Beirut, Lebanon.

include the American Press and the Catholic Press, both of which continue to operate in Beirut. The American Press was originally established about 1850 at Malta for the dissemination of religious education publications in the Middle East. One of the more significant contributions of the press was the design of a new Arabic type face to replace that of Zakhir. Egyptian scribes were commissioned to design the letters and the punches were prepared in Leipzig.

The Catholic Press, operated by the Jesuit Order, has for years produced the best work in this area. It was established in the 1750's at Tamish Monastery in the mountains of Lebanon, where it operated for nearly one hundred years prior to its relocation in Beirut.

The library at Tamish reflects the general disregard for early manuscripts and prints, where worms gorge themselves on ancient volumes (one was noted with the publication date of 1576) to the point where the pages literally fall apart when opened. Several other presses turn out creditable products, but the majority are manned by workmen having few qualifications and little preparation for the job they are trying to do.

A number of monasteries and religious orders maintain printing plants which operate at a decided advantage over their commercial competitors in that they solicit the same market but by Lebanese law are exempt from taxes. This, coupled with practically free child labor, puts the institution in a very favorable position to bid on the open market for jobs.

The majority of commercial establishments employ fewer than four printers and children of eight and nine years are to be found performing menial tasks.

The most striking feature of production in the industry is that it resembles closely the practices current in the United States 65 years ago, although a transformation to more efficient methods has already begun.

But as of now the majority of newspapers published are hand set, principally due to the abundance of cheap labor. Arabic is a relatively complicated language and this also has slowed the introduction of machine composition.

The Arabic alphabet is in script form, and although it consists of only 28 letters, there are several versions of each letter, its form depending upon its position in a word — at the beginning, middle, end, or alone. There are no capital letters. The printed page is read from right to left, with the exception of numbers, which are read from left to right. The usual variety of sizes are to be found in Arabic types but most shops hand cut letters larger than 48-point in a linoleum-like cardboard.

Variatons in faces are limited to light and bold with almost no decorative or novelty types to be found. The font is usually distributed into two cases covering an area approximately three feet square and consisting of 355 boxes. In shops doing more formal work, four cases, comprised of more than 600 boxes, are used. Each shop has its own ideas about the lay of the case, consequently printers going from one shop to another are faced with the problem of learning a different system.

The most common system of measurement is the Cicero — the unit being slightly longer than the pica, 28 Cicero are nearly equal to 30 picas. The Cicero is divided into 12 points and the type sizes are designated in approximately the same manner as in America. Some Arab states, Iraq for example, complicate matters further by using both the American point system and the European Cicero system.

F — A Lebanese compositor sets classical Arabic from cases containing approximately 600 characters

G — Students in the Moslem Orphanage learn hand composition

H — American Point 4 assistance has provided the government vocational school with modern pressroom equipment

Slug casting machines must be equipped with side magazines and plenty of sort trays — one of the reasons for their slow acceptance. Of the operators observed, all are index finger artists — a keyboard fingering system seeming somewhat impractical — especially since Intertype and Linotype use different keyboard arrangements.

The labor-saving devices generally encountered in U. S. composing rooms are conspicuously absent here. Elrod and Monotype rule are unknown, with rule forms being composed exclusively from brass.

A few foundries exist for the production of Arabic type but no leads or slugs are manufactured locally. Soft metal saws, broaches, and mitering machines have not yet been introduced. In the average pressroom the most noticeable deficiency is the lack of an understanding of the principles of makeready. Spongelike packing is added until everything prints. The most unique solution to this problem was discovered in a shop where sheets, after having received sufficient impression to produce Braille, were stacked in a standing press and again squeezed flat. Tympan paper is unknown, ink is ink, and gauge pins are really pins — the kind of straight pins found in the dime store.

Surprisingly, the average shop also maintains a photoengraving department. Prices are low — about 10 cents per square inch — but not lower than the quality of the work. Negatives are rarely touched, etching goes on uncontrolled, and the finished zinc (copper is not used) is nailed to boards that seem to be most suitable for the manufacture of apple boxes. Type high (.928 in., Didot) is achieved only by accident. It is interesting to note that the Koran, holy [illegible] of the Moslems, must by religious law be printed only from engravings made from manuscripts. This eliminates the possibility of typographical errors and thus the risk of blasphemous statements is reduced.

Although wages are low — from about 50 cents per day for a small boy to $2.50 per day for a "journeyman" — production is so inefficient and workmanship so sloppy, that the cost of quality printing is so high that foreign firms find little difficulty in competing for that market. Of course, where quality is not a factor, outside competition does not exist, and Beirut is becoming a printing center for the Arab world.

Two unions, one Communist dominated, exist within the industry. Both are more political instruments than trade unions and none of the objectives

of trade unionism seem to be served. The employers are represented in the "syndicate" which is equally ineffective except as a political instrument.

Labor disputes are mainly arbitrated by the government. Pension benefits are regulated by law — with the odd provision that when a worker moves from one firm to another, he relinquishes all pension rights with his former employer and starts with a clean slate in his new position. Needless to say, employees are hesitant to change jobs frequently, especially if they have accrued considerable benefits.

With the coming of the postwar boom and scramble for world markets — including the oil-rich Middle East — some startling changes have begun to appear. In terms of past customs the change has come too fast and has produced some strange situations — particularly where the sharp salesman is after a fast buck. One of the oddest cases is that of a prosperous Beirut publisher who prints three newspapers. He obviously has the volume to justify a small rotary unit but has been sold a duplex for one paper, a hand fed cylinder for another, and the latest acquisition is a monstrous automatic cylinder press (designed for job and book work) for the third paper. And the room was crowded when he had only one press.

Both Linotypes and Intertypes are selling at a fast clip and offset equipment is springing up all over town — deep etch plates being used almost exclusively. Few American presses are to be found, principally because of prices that cannot compete with Italian, French, and German equipment — especially Heidelberg, whose presses are being imported at an astonishing pace. New equipment brings with it the problem of utilization. The need for trained workmen can probably best be illustrated by incidents typical of industry's attempt to cope with the new technology. One of the most amusing was the instance where a pressman complained that the manufacturer had equipped a press with a motor of insufficient power. A brief examination of the press disclosed that the gummy substance around the lubrication points was linseed oil and that the pressman had for some time employed this kind of "oil" as a "lubricant."

Another pressman complained of inking difficulties — which he certainly did have — chiefly because he adjusted the fountain keys with a small hammer, the result being a corrugated fountain roller and a link to the fountain ratchet with welds upon welds where it had parted from the strain.

In the past year two schools have introduced printing into their curriculums. Prior to this, the trade was learned by a rather loose form of apprenticeship — depending on the interest of the employer. The industry has almost unanimously endorsed the school program and is anxious to begin some type of in-service training for their workmen.

Both schools, the Islamic Orphanage and the Lebanese government trade school, have been given financial and technical assistance in the introduction of printing courses by the United States through its International Co-operation Administration program. An American printing technician has worked with teachers for two years in the development of physical facilities and teaching techniques. Written materials have been developed for basic instruction in the craft — an area previously devoid of any published work in Arabic.

Students are entering three-year programs organized in a manner resembling those to be found in U. S. trade schools. Their time is divided between practical shop practice and academic class work. Although it will be another year before the first students graduate, industry has already expressed its approval by making overtures to prospective employees — employees who should help to bridge the gap between the screw press and the Fotosetter.

Add Enameling to Your Metal Shop

FRANCIS J. KAFKA
Kingsbridge Junior High School
New York, N. Y.

No general metal shop is complete without a specific area in which the student can experiment with and participate in, the art of applying glaze to metal. Copper enameling, as this elementary phase of metalwork is called is the simplest, most popularly known form of the technique. In essence it is basic to the tremendous industry of ceramic glazing of sanitary fixtures, such as sinks, bathtubs, etc.

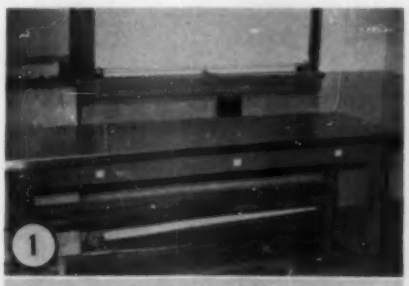


Fig. 1. Steel top bench equipped for storing rod and band stock below. Fig. 2. Bench with backboard

A small area of the shop, possibly one not used very frequently, can house the entire enameling area. Figure 1 shows such an area consisting in this case of a steel top bench, below which rod and band stock are stored. Figure 2 illustrates the erection of a backboard which will serve as a rack for the required equipment, and a shield against daylight and air currents. This backboard is fastened to the table legs with bolts and wing nuts so that it can be easily dismantled and erected at will. With this arrangement the particular unit of shopwork can be introduced or withdrawn from the course work without losing shop space when it is not in operation.

The backboard is fitted with hooks and racks for holding all of the tools and materials. See Figure 3. An asbestos board is attached to this backboard at the location of the kiln. Figure 4 shows the enameling area completely set up for use. Figure 5, a closer view of the area, indicates that an asbestos board has also been placed beneath the kiln and that all items of equipment and materials have been labeled to enable the student to learn the new vocabulary.

It will be noted in Figure 6 that angle brackets are used to permanently

Fig. 3. Backboard fitted with hooks and racks for holding tools and materials. Fig. 4. Shows asbestos board attached behind kiln

fasten the small kiln to the asbestos baseboard. An additional set of angle brackets, fastened with bolts and wing nuts through the backboard, make removal of the kiln a simple operation. The hole in the backboard to the left of the kiln admits the power cord.

Figure 7 illustrates a simple method of arranging the "gum solution," cleaning chemicals, rinsing bath, etc. Metal collars are fastened to discarded kindergarten blocks, and the jars are placed into these collars.

The backboard and holders are painted in a bright color. Handles of all tools and equipment are painted in the same color for simple identification at shop clean-up time.

The addition of this simply-installed enameling area will add enrichment to any program of studies in the general metal shop.

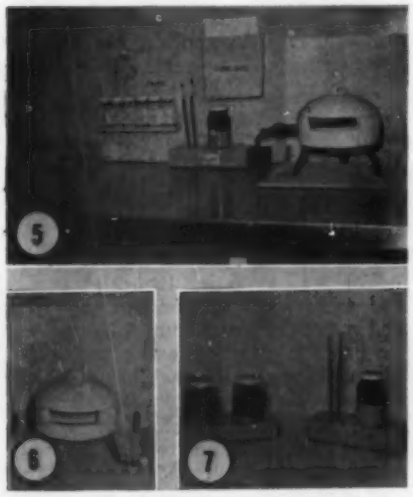


Fig. 5. Shows kiln located in place. Fig. 6. Brackets attached to kiln. Fig. 7. Shows arrangement of gum solution, cleaning bath, etc.

SHOP ORGANIZATION AID

ROBERT Y. ECKELS
Austin Senior High School
Houston, Tex.

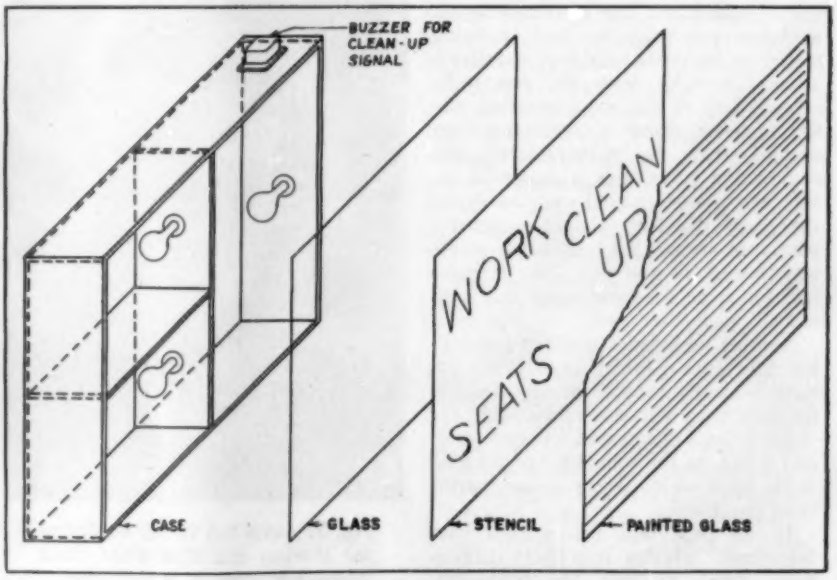
Some years ago, while pondering the idea of shop organization, I fell upon the following ideas:

First, the boys are assigned numbers and as they enter the shop they pick up their numbered aprons from a correspondingly numbered rack. The shop foreman can then check the roll by noting absentees from the aprons left on the hooks. This also allows so much more work time for a class period that is already too short.

The first semester when this method was tried, there was some confusion at the beginning of the period. The boys needed to be notified as to whether they should go to work or take their seats for a demonstration or instruction. To solve this problem I made some signs saying *WORK* and *SEATS*. Using these signs proved to be too awkward to accomplish my purpose. Next I built an electric sign. This sign was constructed in a boxlike fashion with electric lights on the inside separated by partitions of ¼-inch plywood. Over this I placed a sheet of clear window glass. I then cut out in stencil fashion the words *SEATS, WORK, CLEAN UP*, and placed these cutouts over the clear glass and covered them with another piece of glass which I had painted black. When the lights are turned off it looks black, and when turned on the necessary message appears. This gave my sign a nice appearance and it was easy to make it function and the message always was in the same place. Now as the boys come in the shop they pick up their aprons and look at the sign. From this they know what to do.

I went one step further and put a buzzer on top of this box as a cleanup signal. Now when cleanup time rolls around, the toolroom man sounds the buzzer and turns on the cleanup sign. This relieved me of blowing a whistle or shouting over the shop noise for cleanup.

I have used this organization plan for two years, and have found it very successful in allowing more work time and in making the shop more automatic so that in the event of my absence it still operates efficiently and effectively. It also gives the boys the feeling that it is their shop and their job to keep it running smoothly . . . all of which adds up to a better shop program.



A shop organization aid

REPRODUCTION OF SHOP DRAWINGS — Part V

LAWRENCE S. WRIGHT
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Iowa State Teachers College
Cedar Falls, Ia.

Sources and Trade Names of Print Papers

Because of the many trade names applied to the various processes for reproducing shop drawings, confusion in terminology has existed. The literature in the field of industrial-arts drawing has not been entirely free from guilt with regard to the spreading of this misinformation. One of the new drawing books published late in 1954 has a chapter in which the dry diazo process is discussed under a heading which is a trade name assigned by a prominent manufacturer. In this same publication, the moist diazo process is discussed under a heading which is the trade name used by another manufacturer.

Another industrial-arts drawing book published in 1954 has a chapter devoted to a discussion of various shop reproduction processes entitled "Blueprinting." In this chapter "blueprinting" is used as an all-inclusive term embracing dry diazo, moist diazo, and Vandyke printing as well as blueprinting itself. The probable derivation of this error is simple enough when it is recalled that the blueprinting process is the oldest of the methods used to reproduce shop drawings.

In an effort to clarify the matter of terminology, several leading manufacturers were asked to identify the general trade name assigned to their products under each of the headings for the five basic processes used by industry in the reproduction of shop drawings. The results may be seen in Table 1.

RAIN WATER CAN DAMAGE YOUR BATTERY

FRANK P. PLOVICK
Field Service Manager
Delco-Remy Division
General Motors Corporation
Anderson, Ind.

Many car owners think they are playing safe if they use rain water in their automotive battery. Actually, rain water can cause battery damage if it has been standing in metal containers or eaves troughs. Such water is likely to have absorbed iron or other metallic impurities which can ruin a battery in a very short time.

Water as it falls from the sky is one of the safest things the motorist can put in his battery. But the car owner should wait until the drain pipe is well flushed before collecting rain water for battery use. Catching it in a glass, plastic, or earthenware container is a further precaution against contamination.

Collecting rain water in this way may seem like a lot of trouble, but the makers of Delco batteries believe that the extra time spent will pay off in longer battery service life.

Steel drums are being used to sound out the intricate rhythms and melodies of West Indian music. The oil drums — painstakingly "tuned" — are the sole instruments used by entire bands in Trinidad and some of the other islands. — *Steel Facts.*

An oil industry "cat cracker" — a catalytic cracking plant — costs about 20 million dollars to build. This doesn't include the operating costs for such items as electricity, water, wages, taxes, additives for oil and gasoline, transportation, and so on. — *Petroleum Newsnotes.*

Fort Humphreys, D. C., changed its name to Army War College on October 1, 1939. — *Wisconsin Military District.*

TABLE I. Manufacturers' Trade Names Used in the Several Basic Processes for Reproducing Shop Drawings

Manufacturers	*Dry Diazo*	*Moist Diazo*	*Blueprint*	*Vandyke*	*Photographic*
Charles Bruning Co., Inc.[1] 4700 Montrose Ave. Chicago, Illinois		COPYFLEX	Gold Seal Evertite	Superior Brownprint	Photoline
Eugene Dietzgen Co. 2425 N. Sheffield Ave. Chicago, Illinois	DRIPRINT	DIRECTO	BLUEPRINT	VANDYKE	COPYALL[2]
Keuffel & Esser Co. Adams and Third Streets Hoboken, New Jersey	HELIOS	ONYX	BLUEPRINT	MADURO	PHOTACT
The A. Lietz Co. 840 Post Street San Francisco, Calif.	Lietz Positive Print Diazo				
Ozalid, A Division of General Aniline and Film Corporation Johnson City, New York	OZALID[3]				
The C. F. Pease Co. 2601 West Irving Park Chicago, Illinois	WHITEPRINT		BLUEPRINT	VANDYKE	AUTOPOSITIVE
The Frederick Post Co. Box 803 Chicago, Illinois	Vapo	Veri-Blac & Blakline	Blueprint paper	Sepia Tone	Refax

[1] This company includes an additional category "Reproduction Process" which they called "CB" which they state "pertains to a process which has points of similarity with the others but which is unique."

[2] The manufacturer of this product states that "while this is a photographic emulsion paper, it will only print by the Contact and Reflex method."

[3] Specializes in a complete line of dry diazo materials.

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

GETTING YOUR MONEY'S WORTH OUT OF THE SCHOOLS

FREDERIC P. WIEDERSUM, a school architect whose firm has designed some 250 school buildings in the past 30 years, recently stated in an article that since World War II schools have become the center of community life, especially so in fast growing unincorporated areas.

Nonpartisan groups, such as the League of Women Voters, Parent-Teacher Associations, civic organizations, community players, etc., besides adult education classes, make greater use of our educational facilities than ever.

For adult education, shops equipped with man-sized hand and power tools, auditoriums, and kitchens for community events, and parking areas larger than would be normally required for faculty and students for daytime occupancy, are a modern must. Playfields, too, must be enlarged beyond what was necessary for afterschool play.

Taxpayers reap a greater benefit because more foresight, based on accurate and expert population forecasts, enters into school planning, and over-all planning includes provisions for future additions and school extensions.

While costs of building continue to rise, school planners and architects give the taxpayer greater values and more attractive school buildings.

Unnecessary ceiling heights can be reduced to cut down costs, and slab-on-grade foundations can be used to eliminate basements that may not be needed.

New materials also help cut costs, besides lowering construction and maintenance costs. Flush lockers, closets with sliding doors can be used to conserve space.

To further cut costs, present school architecture avoids excessively wide corridors and stairs, expensive marble walls in school shops, and ponderous stone exteriors.

More and more our schools begin to look as though they belonged to this era. Of course, in the larger cities, the older schools still bear the marks of antiquity and obsolescence.

AREA VOCATIONAL EDUCATION

DR. M. D. MOBLEY, executive secretary of the American Vocational Association, Inc., now in Pakistan on a vocational program planning mission, in his AVA Washington letter of August 30, 1957, urges all who are interested in vocational education to ask the members of the National Congress to vote for favorable action on S-1298, the area vocational education measure.

The population of our country, we are told by recognized authorities, will exceed 200 million by 1970. That is just 12 years from now.

The area vocational education measure, when enacted into law, would stimulate states and local communities to develop programs that would give suitable vocational education to the increased number of youth and adults who will have to prepare themselves if we are to provide for the security and well-being of our nation, and to assist low-income nations in their efforts to develop their own programs of vocational and industrial arts education as one of the surest ways to prevent the spread of Communism.

Vocational education in the United States must expand greatly if we are to remain a strong and prosperous nation.

At the same time he asks that a good word be put in for Section 13 which authorizes aid for state supervision of industrial arts. Only a little over one fourth of our states are provided with such a supervisor.

IS YOUR SHOP SAFE AGAINST FIRES?

FIRE PREVENTION WEEK should have a definite meaning for students and teachers in the school shop.

For the student it is well to start with the home. Tell them in a definite way what to do to reduce the fire hazards that demolish so many dwellings and cause so many deaths each year.

Some of the teachers and students have summer homes and camp sites which are unsupervised months at a time. Just what steps can be taken to make places like that more fireproof over the months when they are not in use?

And then — what about the school shop? And what about the techniques used to make the fire inspection of the shop, the materials' storage rooms, the various cabinets, etc., where paper, books, oils, paints, lacquers, fillers, wiping rags, aprons, and shop coats are kept?

Are your fire extinguishers in proper order? When have they been inspected the last time? Have you planned what you would do if a fire suddenly broke out in your shop? Have you more than one entrance to your room? If not, see that another door is provided at once. It is too dangerous to risk your life and the lives of your students in a closed-up area where a fire could cut you off from an avenue of escape.

Fire in a school shop can spread very fast, and there cannot be too many opportunities for your students to get out before they sustain fearful burns.

INDUSTRIAL ARTS AND SKILL

IN THE early days of manual training, skill was greatly emphasized. The joints which at that time practically made up the entire course for the woodworking shop, which in most cases was the only shopwork open to the student, had to be almost perfect before they were accepted by the instructor. If they did not fit exactly, the boy went back to his bench and started over.

Later on when manual arts and industrial arts came into the picture, the idea of skill somewhat lost its force, and for a while it seemed that skill was relegated to a minor position.

With present-day experience augmented by that gained during World Wars I and II, manipulative skill is not only a desirable possession, but actually a very necessary acquisition, and the industrial-arts shop may well be looked upon as the place where our youth should acquire not only a knowledge of tools, but also a thorough knowledge of how to use them correctly.

Everybody is quite ready to admit that the children attending our schools should learn to read, write, and use arithmetic with considerable skill. Acquiring skill in the fundamentals of the use of tools and materials is equally necessary.

Periodically there is an uproar that the children in our elementary school do not learn to spell correctly. Giving them more skill in spelling is strongly urged. In the field of industrial arts we should also emphasize shop skill, because this skill may be as needful to our boys as their knowledge of correctly spelling and using words.

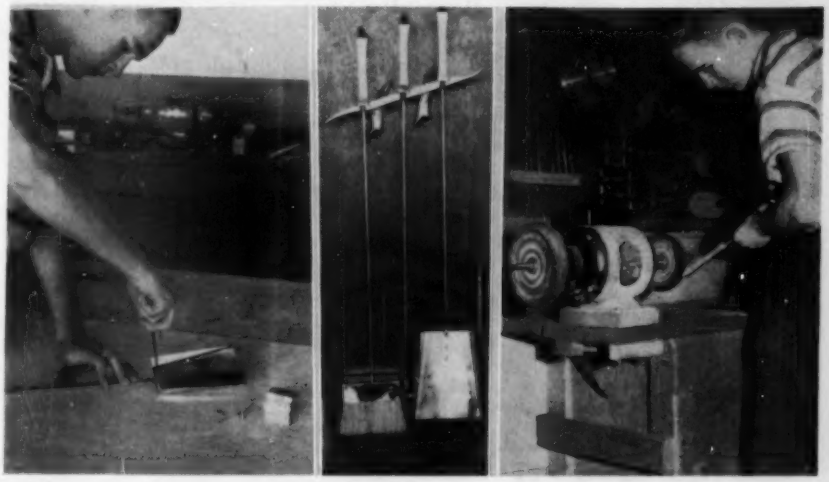
Problems and Projects

BRASS FIREPLACE SET

CHARLES JOHANSEN
8th Grade Student
Hoover Elementary School
Redwood City, Calif.

The fireplace set described and pictured* in this article is simple in design yet possesses a rich appearance due to its simplicity in design.

The holder and brackets are so designed that when slanted it adds more to its rich appearance than if it were in a horizontal position. The drilling of the holder is difficult because the drill may drift if not centerpunched properly. The end curves of the holder were not bent, but were bandsawed and sanded with a 6-in. electric belt sander.



Forming and assembling the parts of the fireplace set

Procedure

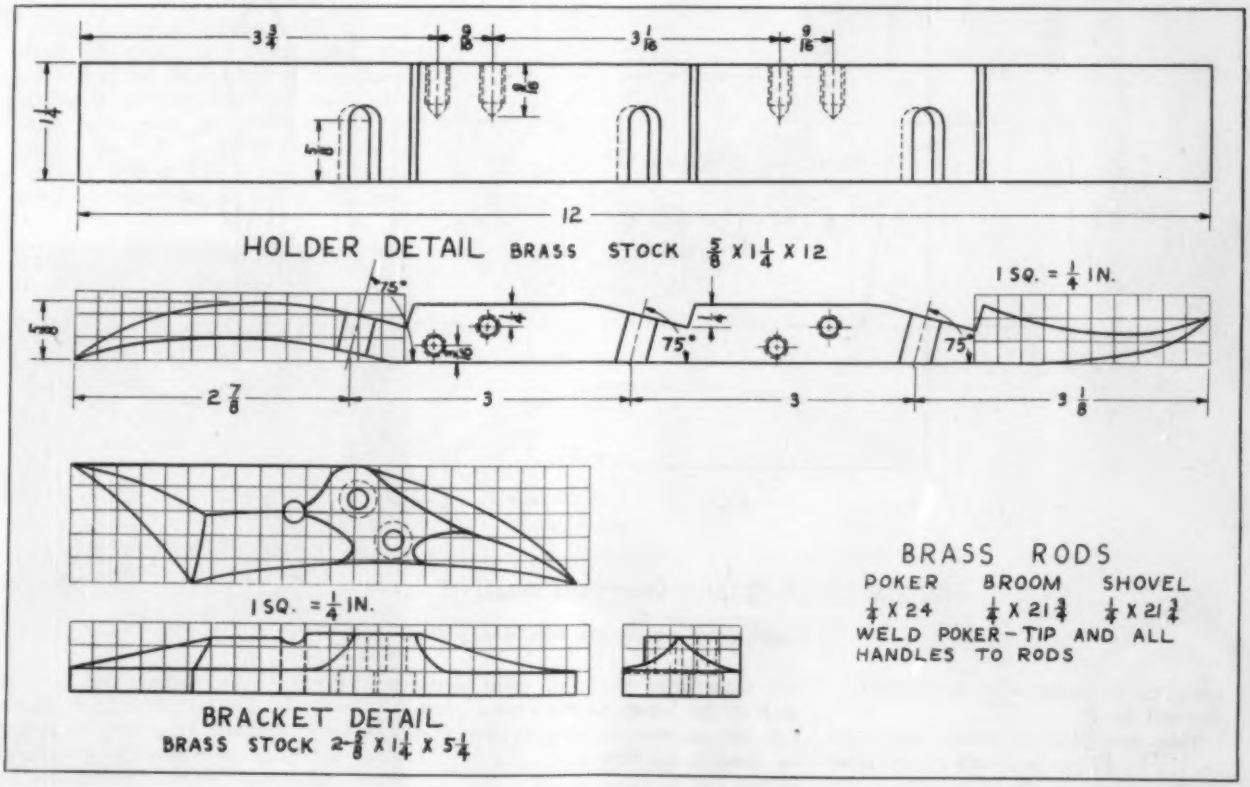
Handles:

Take three pieces of brass bar ¾ by ¾ by 5¾ in. Drill a ¼-in. hole in one end of each bar ¾ in. deep. Shape as shown in the drawing.

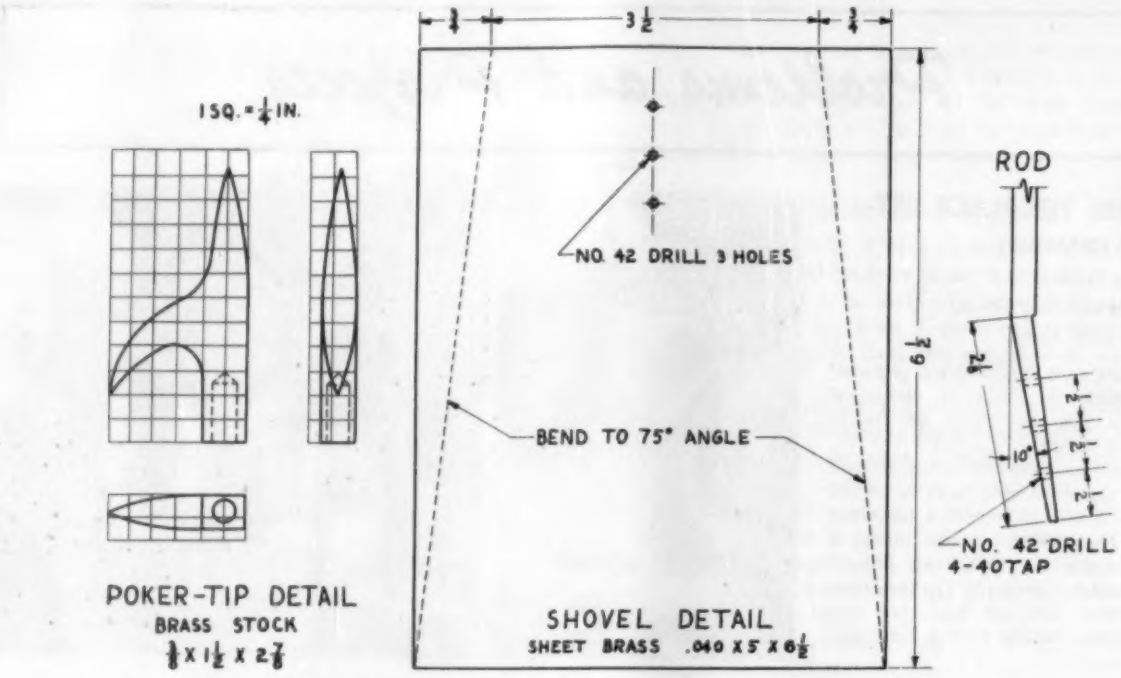
Poker Tip:

Take one piece of brass bar ⅜ by 1½ by 2⅞ in. Drill a ¼-in. hole ¾ in. deep. Once the layout is completed, bandsaw the poker to rough size and file with round and half round metal files. Finish the

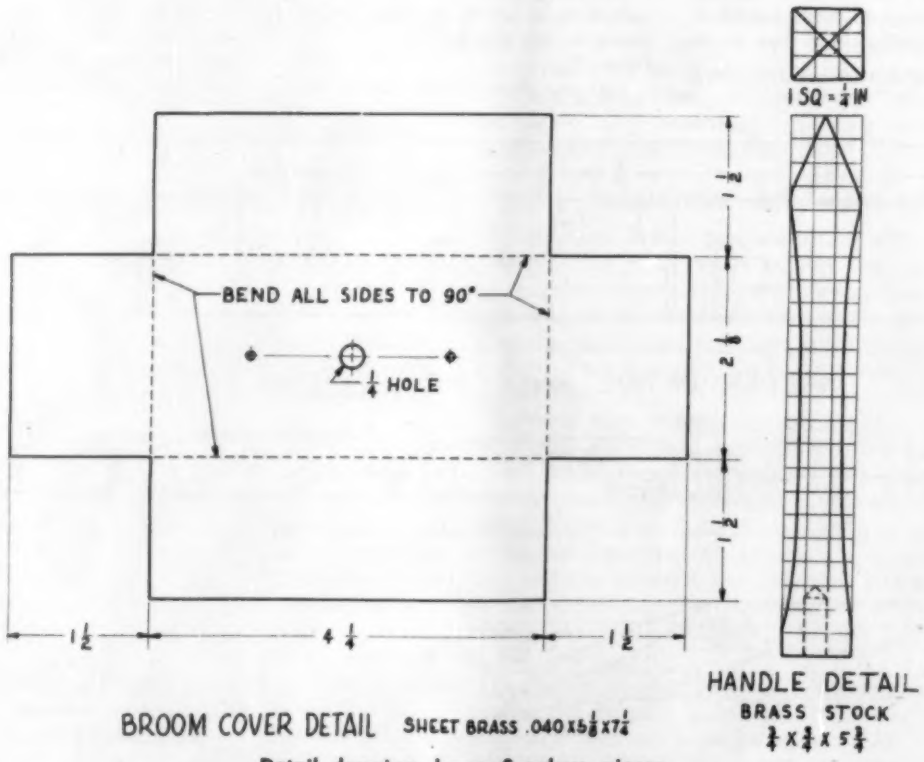
*Photographs by Al Block, director of arts and applied arts, Redwood City School District.


HOLDER DETAIL BRASS STOCK ⅝ X 1¼ X 12
1 SQ. = ¼ IN.
BRASS RODS
POKER ¼ X 24
BROOM ¼ X 21¾
SHOVEL ¼ X 21¾
WELD POKER-TIP AND ALL HANDLES TO RODS
1 SQ. = ¼ IN.
BRACKET DETAIL
BRASS STOCK 2-⅝ X 1¼ X 5¼

Details of holder and bracket



Details of fireplace pieces



Detail drawing, brass fireplace pieces

poker tip by using small jewelry files.

Broom Cover:

Take one piece of brass plate .040 by 5⅛ by 7¼ in., and drill a ¼-in. hole in the center of the plate. Then drill two small holes for small wood screws to hold the broom to the broom cover. Cut out sections of plate as shown in the drawing and bend.

Shovel:

Take one piece of brass plate .040 by 5 by 6½ in. Use No. 32 drill and drill as shown in drawing. Then drill three holes in the rod to correspond with those on the shovel with a No. 42 drill and tap

with a 4-40 tap. Now bend the rod and shovel plate as shown in drawings.

Holder:

Take one piece of brass bar 5/8 by 1¼ by 12 in. Drill holes in the bar at the correct angle as shown. Sketch in ends as desired.

Holder Wall Brackets:

Take two pieces of brass bar 5/8 by 1¼ by 5¼ in. Drill holes in pieces, before shaping, as shown. Sketch in design as shown.

BILL OF MATERIALS

No.	Pcs. Req.	Part	Material	Size
1.	3	Handles	Brass	¾ x ¾ x 5¾ in.
2.	1	Shovel	Brass	.040 x 5 x 6½ in.
3.	1	Broom cover	Brass	.040 x 5⅛ x 7¼ in.
4.	1	Holder	Brass	5/8 x 1¼ x 12 in.
5.	2	Holder Wall brackets	Brass	5/8 x 1¼ x 5¼ in.
6.	1	Brush	Masonry	2⅛ x 4¼ x 4¼ in.
7.	7	Machine screw Round head	Brass	4-40 x ¾ in.
8.	4	Machine screw Round head	Brass	3/16 x ¾ in.
9.	2	Brick fasteners Screws	Brass	¼ NC20
10.	2	Wood screws	Brass	5/8 in.

WHITTLING PROJECT— TRUMPETER SWAN

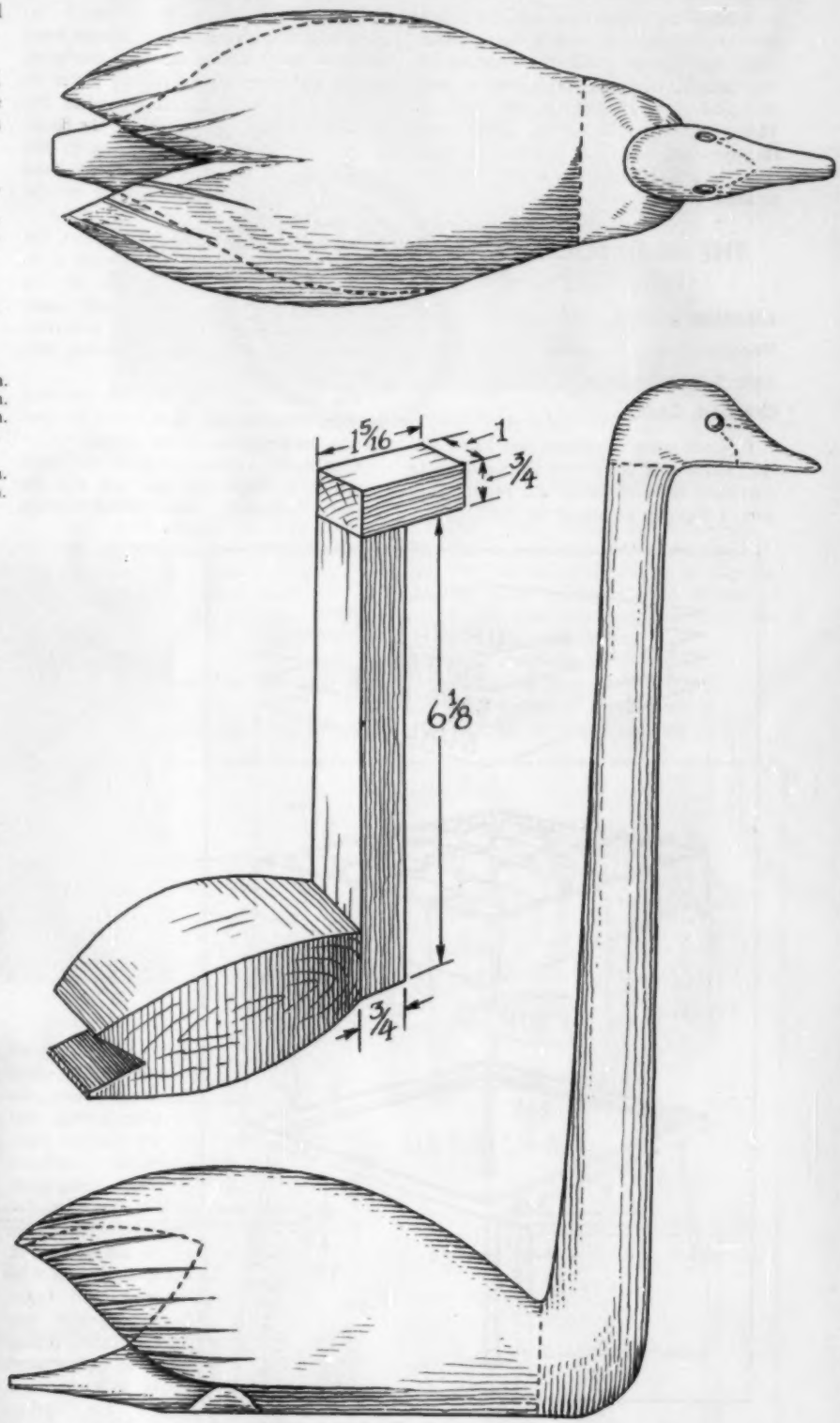
BEN HUNT

Hales Corners, Wis.

This somewhat stylized bird is best made by gluing up three pieces. The joints will not show after it is painted. Gluing it up this way does away with short cross grain pieces which break so easily. Saw out the body before gluing the neck onto it. The dotted lines in the top view show the outline of the base, which, by the way, is supposed to be the water line. Undercut the wings as indicated by dotted lines in the side view drawing. Make the eyes with a hollow point nail set by pressing and turning at the same time.

The entire bird should be very carefully sanded, first with medium abrasive paper

The trumpeter swan



Actual size of the trumpeter swan pattern

to remove the knife cuts, and then with fine abrasive paper to remove the scratches from the coarse stuff. The painting is very simple. Give the entire bird at least two good coats of white lacquer or dope. Three will be still better. Then paint the eyes and the beak black. The knee joints, right above the *water line* are painted orange.

THE REAL LOOK IN TV FOOT STOOLS

CHARLES McGILL, Instructor
Vocational and Industrial Arts
John Swett Union High School
Crockett, Calif.

I priced them downtown and found TV foot stools sold for fifteen dollars or more but then there is labor and profit. Anyway I figured we could do better.

Take a piece of ⅛ by ⅝ by ½ in. angle iron and give it a 16-in. square bend with the flange turned in. After the bend, square and weld, then cut four pieces of ⅛ by 2 by 4-in. band iron, miter the corners and weld to the inside of the flange of the frame. Drill ½-in. holes in the corner pieces to receive the legs, and drill four ⅜-in. holes in each of the bottom flanges to hold the seat unit.

When the steel frame is complete, cut four lengths of ½-in. round stock 8 in. long and set them in the holes of the corner braces. Give them a slight angle and weld securely. The frame is now complete except for sanding and painting with dull black lacquer.

The next step is the seat unit and may be considered as the most important part in the construction of the project.

First make a wood box to fit the frame about 4 in. high and glue and nail the corners. Purchase three no-sag springs with clips from an upholstery shop. These are the same springs that are used in automobile cushions and in some modern furniture.

Nail the clips to the wood box, spacing them 4 in. apart and fasten the springs into the clips, pulling them tight enough to give an arch. As the springs have a tendency to move from side to side it is necessary to tie each spring firmly in place with heavy twine and nail to the wood box.

Now you are ready to upholster. This may seem the most difficult part of the job but with a little practice you can achieve amazing results.

The materials required are: tacks, burlap, black liner, cane back, cotton, and upholstery. I paid twenty cents for the cotton, ten cents for the black liner, twenty cents for the cane back and one dollar twenty cents for the upholstery. The finished stool cost $2.50 including the steel. It will depend, however, on the kind of upholstery you purchase if you desire to keep the cost down.

Finish off the project with rubber tips on the four legs and touch up any marred parts of the steel frame with the black lacquer.

Important Steps in Covering the Seat Unit

1. Stretch the burlap over the no-sag springs and tack to the top edge of the wood box. (Double fold the edges of all material for more strength.)

2. Cut the cane back to the size of the wood box and tack to the top edge.

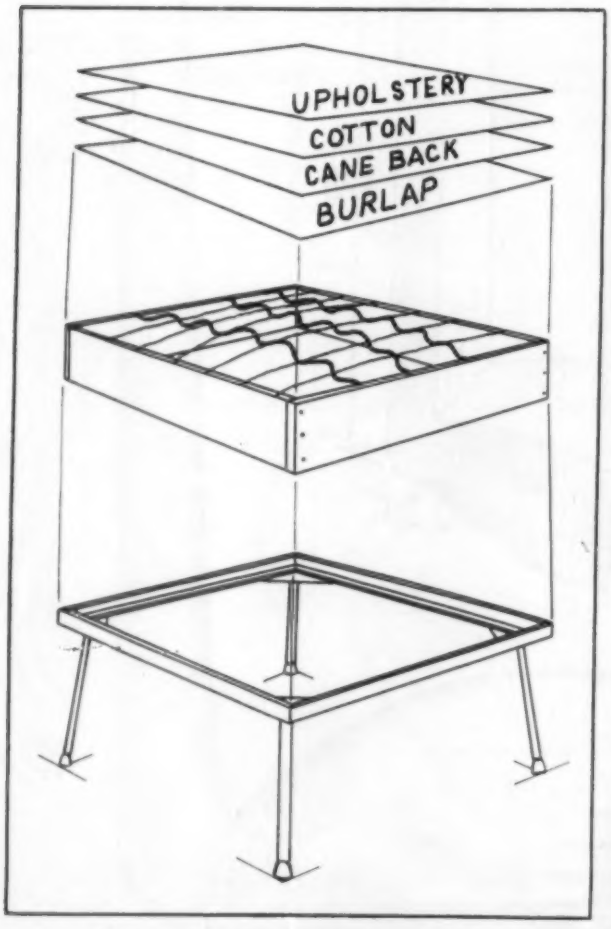
3. Lay the cotton bat over the top of the cane back and fill between the springs with strips of cotton, thus making the top fuller.

4. Stretch the upholstery over the top and down the sides of the wooden box and tack under the box. (Fold the corners carefully making sure they are tight and neat. Finish off with a few ornamental tacks.)

5. Tack the black liner under the frame.

The cushion is now complete and can be fastened to the steel frame.

This is more than a project for it can become one of the more useful items in the home. Dad is bound to be proud of his son when he stretches out his tired feet on that new soft cushion to watch his favorite television program.



Construction details of the TV foot stool

TV foot stool

Two days later I turned out a model and the kids were yelling to make them. So if you are looking for a different project, with high school shop appeal, try this for the real look.

Falls caused half the accidental deaths in the home — 13,100 in 1956.

COFFEE TABLE

REX MILLER
Assistant Professor
Industrial Arts Education Division
State University of New York
Teachers College
Buffalo, N. Y.

The table described here is to be made of quarter sawed oak, kiln dried. Dowels are to be glued into ⅜-in. deep holes in side rails. Holes for 8*d* nails are to be drilled through side rails and partway into leg. Side rails to be glued to legs. Cross arm and leg joints to be glued and reinforced by two No. 9 by ¾-in. F.H. woodscrews, countersunk and holes plugged. Finish to be 1 coat white shellac and 2 coats satin finish varnish. Finish to be sanded between coats with 6/0 or very fine sandpaper. Three coats of paste wax to be applied and buffed to desired gloss.

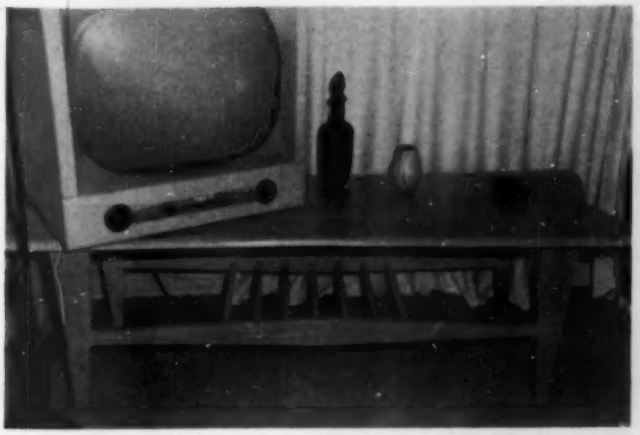


Fig. 2. The table used as a support for a table model TV

Steps of Procedure

1. Select stock and enter on record card.
2. Have selection checked by instructor.
3. Mark stock and cut to specified lengths and widths.
4. Have instructor check work so far.
5. Glue up top.
6. Have instructor check work on top.
7. Cut taper on legs, rough sand.
8. Cut taper on side rails, rough sand.
9. Have work checked by instructor.
10. Cut leg and side rail joints as shown at detail *A* in Figure 1.
11. Have instructor check work.
12. Assemble side rails and legs, sand.
13. Have assembly work checked by instructor.
14. Drill dowel holes in side rails. Use ¾-in. Forstner bit.
15. Assemble all four legs and side rails putting in dowels and double-T top brace.
16. Have work checked by instructor.
17. Put in 2 by 2-in. brace blocks.
18. Cut top to specifications in drawing.
19. Use router to round edges of top.
20. Rough sand top and fine sand legs, side rails, and dowels.
21. Have instructor check work.
22. Attach top to assembled frame.
23. Have instructor check work.
24. Sand all surfaces until smooth.

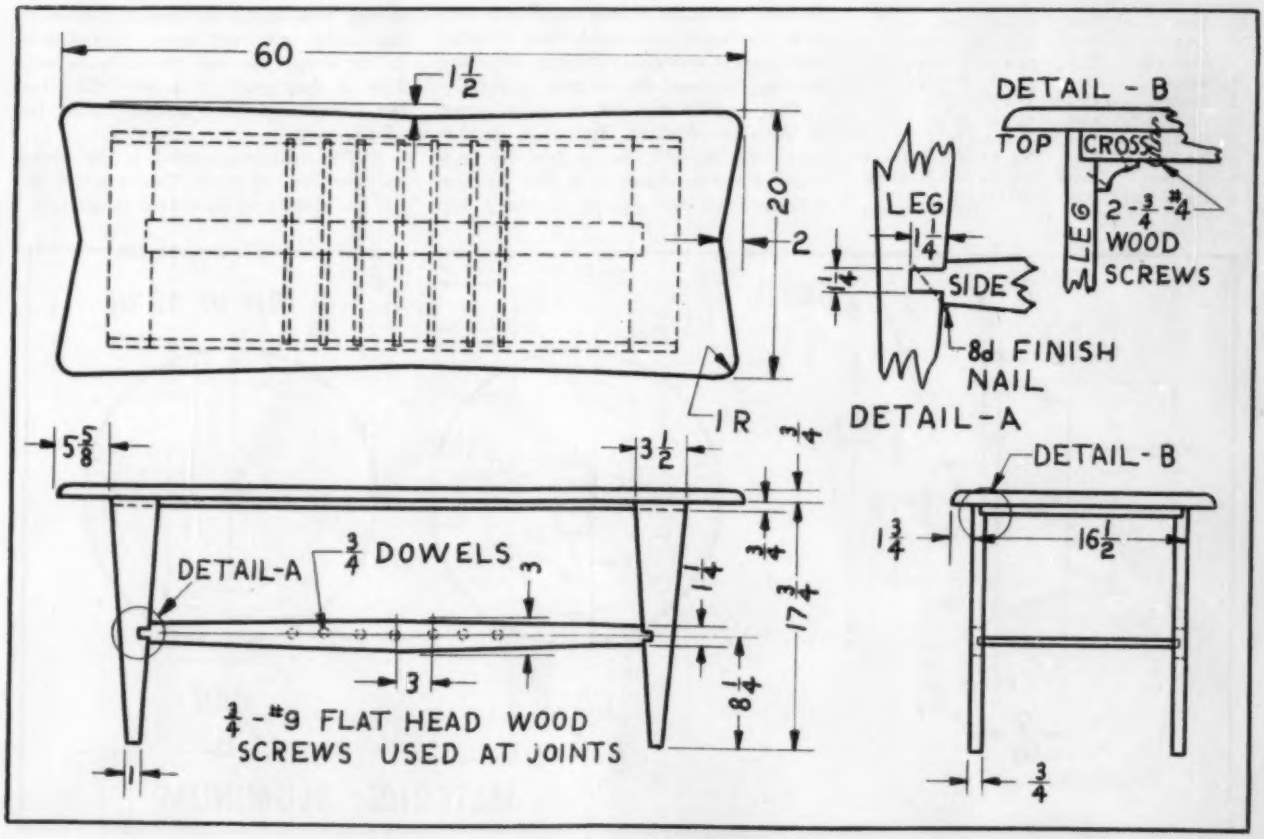


Fig. 1. Details of the coffee table

Fig. 3. David Wilson, sophomore, finishing his table

25. Apply finish.
26. Apply test of workmanship.
27. Have instructor grade your work.

BILL OF MATERIAL

No. of Pcs.	*Name of Part*	*Kind of Material*	*Finished Size (in inches)*
5	Top	Oak	¼ x 4 x 60
4	Legs	Oak	¼ x 3½ x 17¾
2	Side rails	Oak	¼ x 3 x 46¼
1	Brace	Oak	¼ x 3 x 46¼
2	Brace	Oak	¼ x 3½ x 15
4	Leg blocks	Oak	¼ x 2 x 2
7	Dowels	Oak	¼ dia. x 15¾
8	Screws	Steel	No. 4 x ¾ F.H. Bright
18	Screws	Steel	No. 9 x ¾ F.H. Bright
4	Finish nails	Steel	8*d*. F. head

Test of Workmanship

1. Is the grain alternated in the top?
2. Is the taper on legs same on all four?
3. Is the taper on side rails same for both?
4. Are the dowel holes the correct size?
5. Are the leg and side rail joints tight?
6. Is the table level?
7. Is the table stable?
8. Are all screws out of sight?
9. Is the space from the legs to the end of top equal on all four legs?
10. Are the dowels spaced evenly?
11. Is the finish free of runs?

PERMASTOP — SINK STOPPER

ALFRED GRAYSHON
Machine Shop Instructor
Olney High School
Philadelphia, Pa.

Many wash basins used in school shops, etc., are provided with a rubber stopper on a retaining chain. These stoppers have a short life, because of the usual carelessness of individuals. For that reason they have to be frequently replaced.

A solution may be found by producing a stopper made of aluminum as shown in the illustrations. The writer was agreeably surprised at the longevity of these stoppers made and installed in his school shops. Without exception it was found that they were practically permanent. Once installed with a brass sash-chain retainer, they have not been replaced for the past 15 years.

They may be cast and dressed as shown at *A* in the working illustration, or they may be machined from a 2-in. cast cylinder or bar as shown at *B*. The principal difference is that casting *A* has a lug, whereas *B* has a 10-32 tapped hole for a roundhead brass screw to which the length of sash chain is fastened as a retainer. Also the machining will give a better fitting surface than hand dressing, for a water seal.

GLUE AREA

JOHN C. McCRORY
Industrial Arts Department
Penn High School
Greenville, Pa.

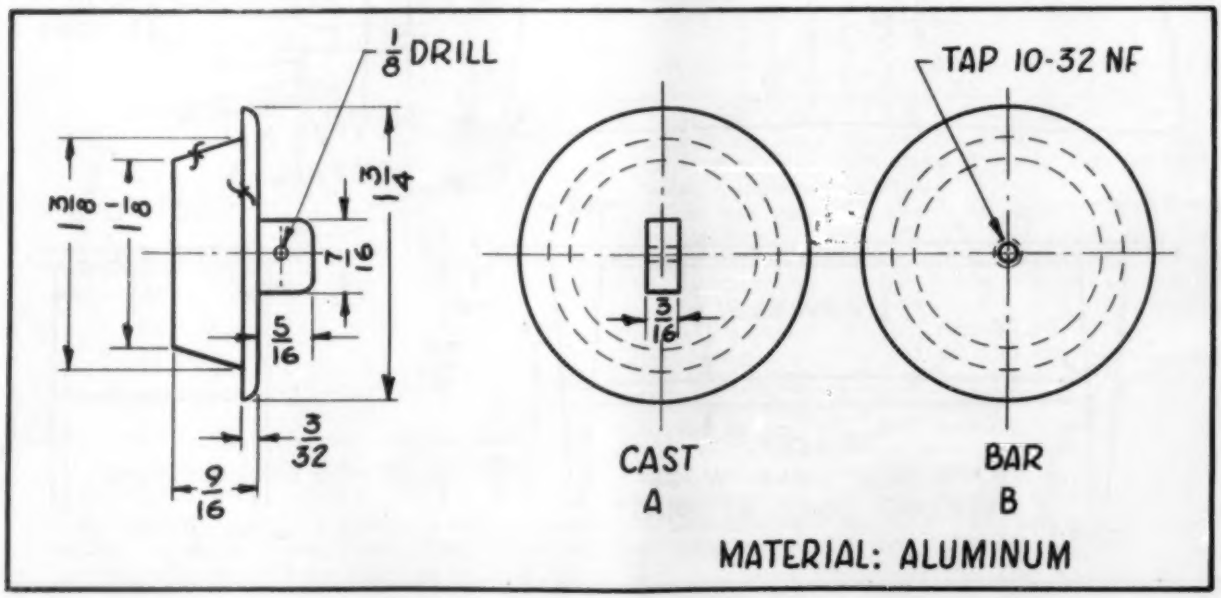
Every shop should be divided into areas to eliminate unnecessary walking and wasting of time. The area herein planned, I believe, is complete and all necessary material and equipment is within easy reach.

The glue area should be equipped with the following three necessary pieces of equipment.

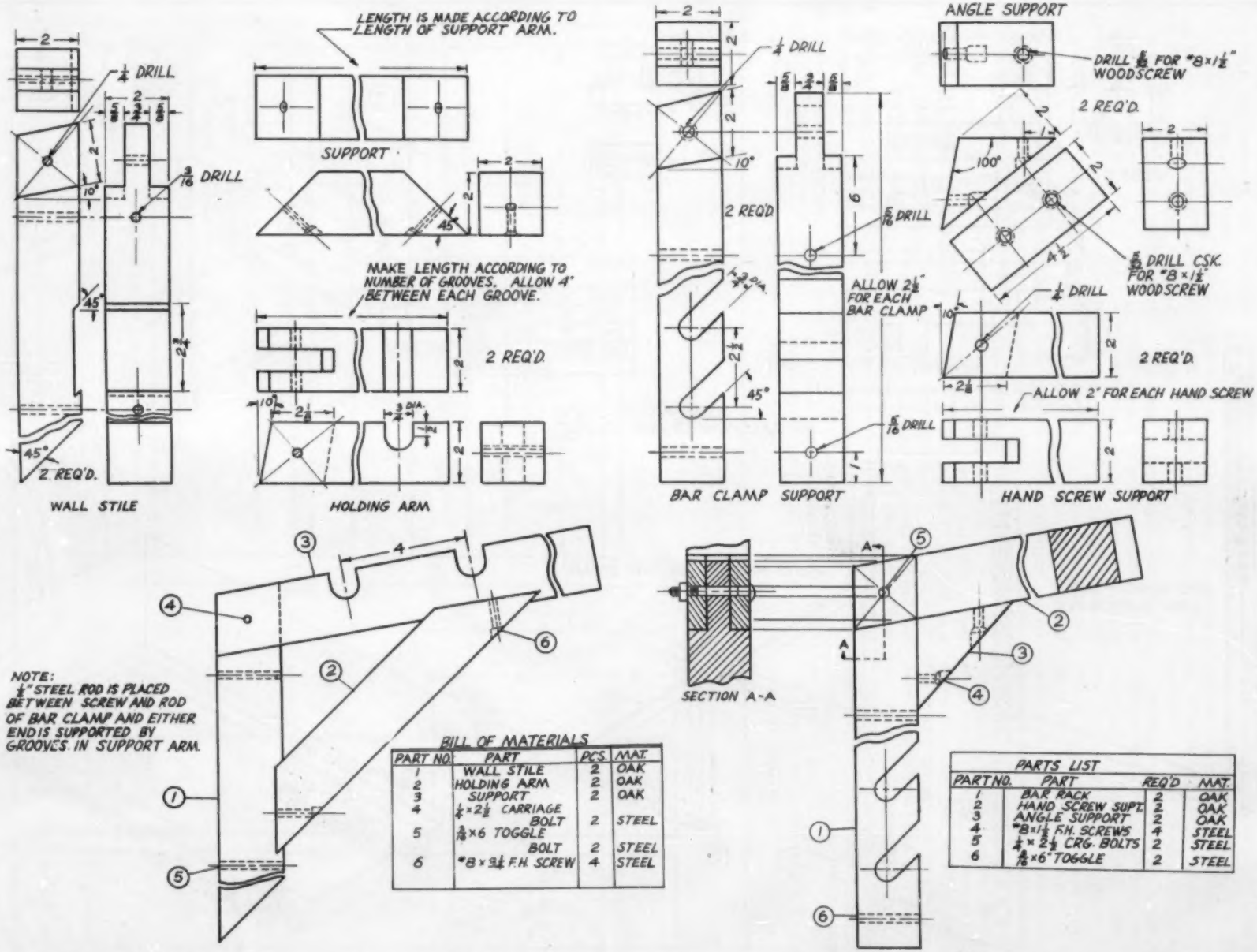
1. The first piece is the glue bench. This bench has a slide track and blocks that are adjustable in either direction to fit any size gluing job. The blocks are self-locking and cannot come loose or be misplaced. A mallet and pounding block are also provided at the bench. This system may be used with a bench or with saw bucks. It may also be used for hot or cold gluing.

2. The next requirement is the bar clamp and hand screw storage rack. This storage rack should accommodate as many bar clamps and hand screws as you have in the shop. The one shown takes only 2 in. of shop space. It is self-locking and the clamps and hand screws cannot fall off the rack.

3. The final requirement is the drying rack for glued-up stock. This rack will permit the storing of from four to six pieces



Details of the aluminum sink stopper


LENGTH IS MADE ACCORDING TO LENGTH OF SUPPORT ARM.
SUPPORT
MAKE LENGTH ACCORDING TO NUMBER OF GROOVES. ALLOW 4" BETWEEN EACH GROOVE.
2 REQ'D.
WALL STILE
HOLDING ARM
ANGLE SUPPORT
DRILL FOR "8×1½" WOODSCREW
2 REQ'D.
DRILL CSK. FOR "8×1½" WOODSCREW
ALLOW 2½" FOR EACH BAR CLAMP
2 REQ'D
BAR CLAMP SUPPORT
ALLOW 2" FOR EACH HAND SCREW
HAND SCREW SUPPORT
SECTION A-A
NOTE:
¼" STEEL ROD IS PLACED BETWEEN SCREW AND ROD OF BAR CLAMP AND EITHER END IS SUPPORTED BY GROOVES IN SUPPORT ARM.

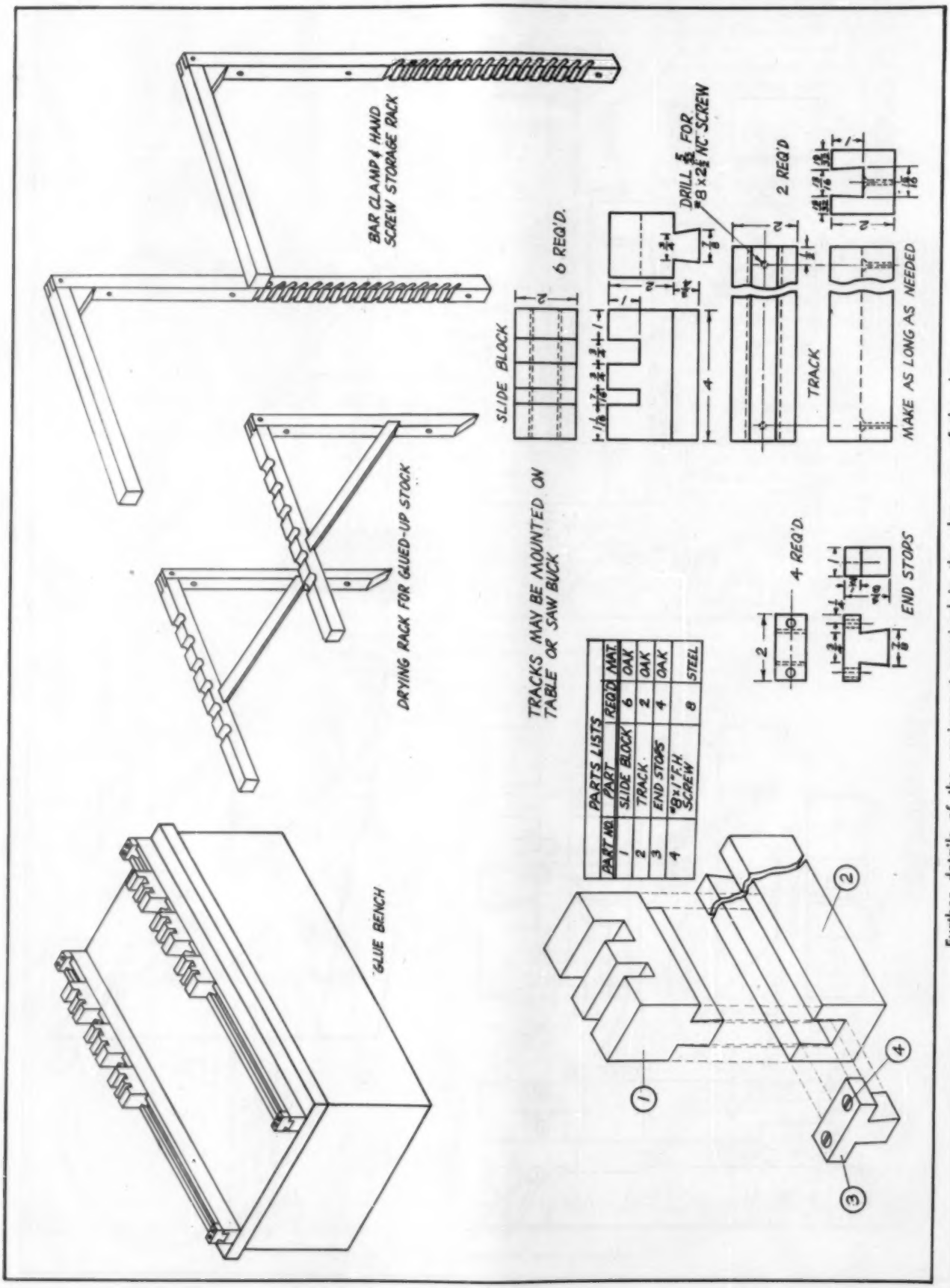
BILL OF MATERIALS

PART NO.	PART	PCS.	MAT.
1	WALL STILE	2	OAK
2	HOLDING ARM	2	OAK
3	SUPPORT	2	OAK
4	¼×2½ CARRIAGE BOLT	2	STEEL
5	⅜×6 TOGGLE BOLT	2	STEEL
6	#8×3¼ F.H. SCREW	4	STEEL

PARTS LIST

PART NO.	PART	REQ'D	MAT.
1	BAR RACK	2	OAK
2	HAND SCREW SUPT.	2	OAK
3	ANGLE SUPPORT	2	OAK
4	#8×1½ F.H. SCREWS	4	STEEL
5	¼×2½ CRG. BOLTS	2	STEEL
6	⅜×6" TOGGLE	2	STEEL

Details of the glue bench, bar clamp, and hand screw storage rack for equipping the glue area. See further details of equipment on next page


BAR CLAMP & HAND SCREW STORAGE RACK
DRYING RACK FOR GLUED-UP STOCK
GLUE BENCH
SLIDE BLOCK
6 REQ'D.
DRILL 5/16 FOR #8 x 2 1/2 NC SCREW
2 REQ'D
TRACK
MAKE AS LONG AS NEEDED
TRACKS MAY BE MOUNTED ON TABLE OR SAW BUCK
4 REQ'D.
END STOPS
PARTS LISTS
PART NO. | PART | REQ'D | MAT.
1 | SLIDE BLOCK | 6 | OAK
2 | TRACK | 2 | OAK
3 | END STOPS | 4 | OAK
4 | #8 x 1" F.H. SCREW | 8 | STEEL

Further details of the equipment required in the glue area of the shop

of glued-up stock and keeps them off the floor and prevents them from being knocked over and ruining the joints. It also keeps the clamps in the immediate area and eliminates the problem of looking over the entire shop every time gluing must be done. Most students have a bad habit of leaving the bar clamps and hand screws where they take the stock out of the clamps.

When using the drying rack, the student should mark his stock with his name and the time of the gluing before he puts it on the rack. Every morning the stock or rack is emptied and the clamps placed in the storage rack so they are ready for the next person who wants to do a gluing job.

A SMALL PARTS CABINET FOR THE SCHOOL OR HOME SHOP

J. HENRY SCHROEDER
Professor of Industrial Education
Southern Illinois University
Carbondale, Ill.

This cabinet will enable one to keep small parts in an orderly manner and in a place that is convenient to use.

It is made of standard-dimension lumber, which can always be obtained at any builders' lumberyard. The tin cans which are used as containers may be salvaged about the home or neighborhood filling station.

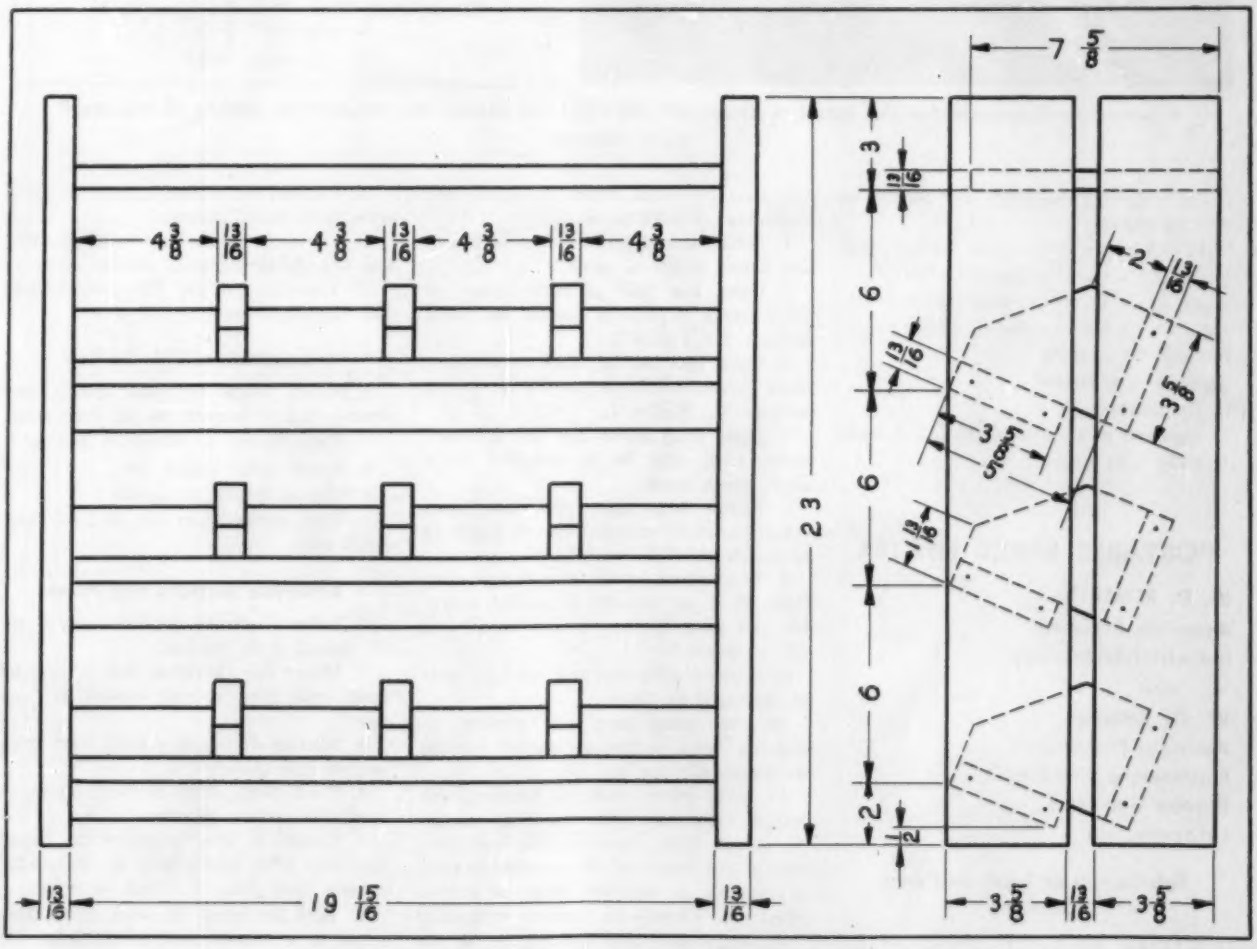
The design and dimensions make it possible to use a variety of containers if this seems more convenient. The compartments will take any of the following containers: fruit-juice cans, No. 404 — 1 qt. 14 fl. oz.; 1-qt. oil cans; 1-qt. Mason jars; or rolled-oats boxes. If smaller containers are desired, either two or four small cans, 6-oz. size, in which frozen or concentrated fruit juice is sold, can be fitted into each compartment. This feature of the cabinet makes it flexible enough to be used in a great many situations.

The containers are removable and can therefore be taken to the workbench or wherever needed. The circular segment of wood fastened inside each container furnishes a convenient place for a label, and also serves as a handle by which the container may be carried from place to place.

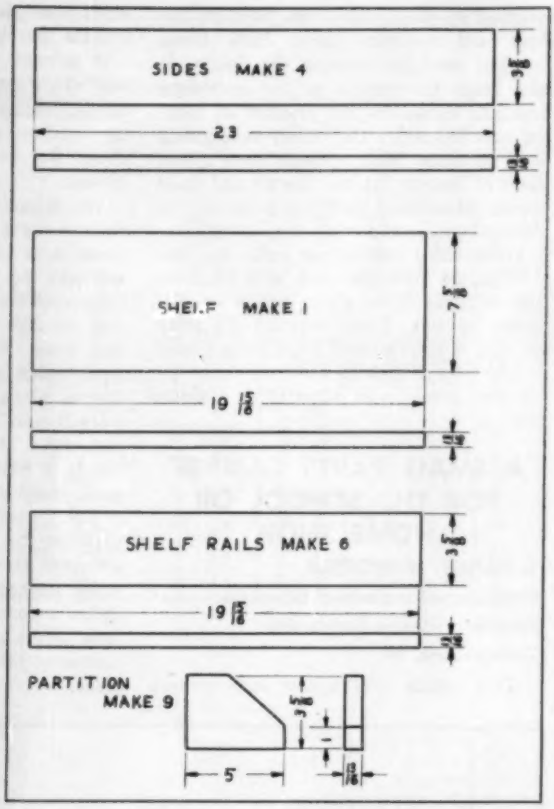
The pouring tray is an essential part of the cabinet as it enables the contents of any container to be emptied and easily poured back into the container. This is a very important procedure as it is often necessary to mix parts of different sizes or kinds in the same containers. For example, it is very inconvenient to have a separate container for each size nut ordinarily used about the home, or an assortment of faucet washers might be kept in a container, and it becomes necessary to empty the contents in order to select the nut or faucet washer of the correct size, and yet one container is large enough to hold an adequate assortment of either item. The same may be true of assortments of screws, nails, cotter pins, rivets, tacks, electric connectors, plugs, or switches. The uses to which different individuals will put this cabinet are so varied and numerous that it is useless to try to enumerate them here.

The cabinet is simply built. It is nailed together with simple butt joints. The shelves and rails serve to hold it together and keep it rigid.

It may sit on the floor, table, or workbench, or hang on the wall.



Details for constructing the small parts cabinet



A small parts cabinet for the home or shop. At the right are shown the construction details of the small parts cabinet

The following materials are needed in its construction:

1 pc. — 1 x 8 x 19⅝ — pine for top shelf
4 pcs. — 1 x 4 x 23 — pine for sides
6 pcs. — 1 x 4 x 19⅝ — pine for shelf rails
9 pcs. — 1 x 4 x 5 — pine for partitions
100 nails 6d finishing
¼-pt. paint or enamel
12 containers
12 segments of wood ¾ in. thick, 1 in. wide
36 nails ¾ in. long

PORTABLE SPACE HEATER

M. D. ROBERTS
Associate Professor
Industrial Technology
and
W. O. Satterley
Assistant Professor
Engineering Graphics
Purdue University
Lafayette, Ind.

Fabrication of Front and Back Sections

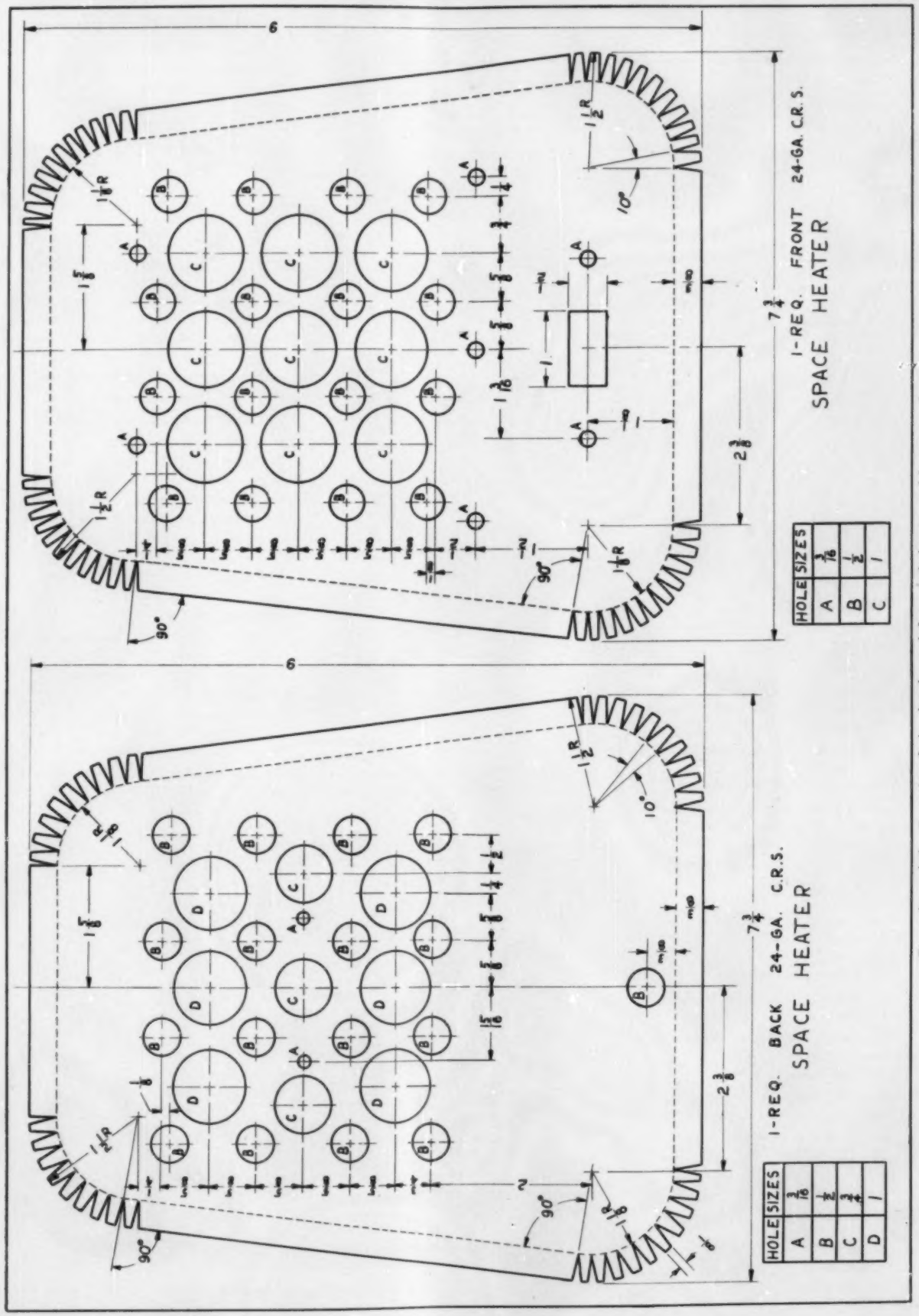
1. Obtain stock from stockroom and remove sharp edges and corners.
2. Establish and scribe a center line lengthwise through stock.
3. Establish and scribe a second center line across width of stock.
4. Using one half of entire piece of stock make layout as shown for back section. See Figure 1.
5. Using this half of stock as template make layout wherever possible for front section. See Figure 2.
6. Using prick punch and light hammer, locate each hole to be punched by a prick punch mark.
7. Follow with same procedure, using center punch to enlarge angle of incidence to match pilot of bench punch.
8. Now, check layout of each half carefully. It is yet possible to correct errors. Do you have corners broken down into 10° sections?
9. Proceed with punching out hole sizes as indicated on layout.
10. Cut along lines and remove remaining metal in preparation for forming to shape. *Do not use file.*
11. With burred side up, hammer each section vigorously with raw hide hammer on layout plate. Localize this operation toward the center of the punched portion to produce an outward bulge or convex effect for strength in finished sections.
12. Bend each side and end to 90° on metal brake.
13. Flatten out curved corner sections again with brass hammer.
14. Clamp in vise behind metal or wood and tap metal segments around curve.
15. Examine curves for irregularities and file down smoothly.

Fabrication of Side Section

1. Obtain stock for side section and remove safety hazards as on first piece.
2. Make layout as shown in Figure 3.
3. Punch holes called for.
4. Cut to length as shown.
5. Bend curves to fit arc on 2-in. sheet metal rolls.

Assemble Sections and Paint

1. Using *C* clamps try side section for fit around front section.
2. Manipulate curves in side section by hand until they fit well around arc and sides.
3. Starting at top in center, weld front section into place.
4. Weld short strip across bottom to hold side section together.
5. Clamp in vise behind wood blocks and tap sides gently but firmly around corners and sides of front section.
6. With flat hand file work down these edges to a smooth rounded surface.
7. Insert back section, drill No. 40



Figs. 1 and 2. Details of the back and front of the portable space heater

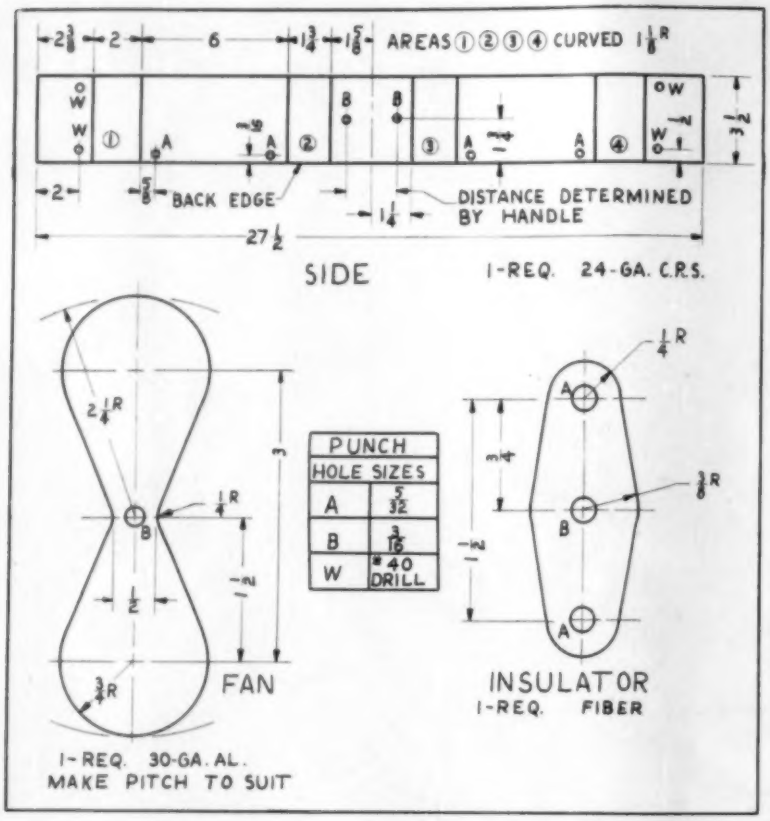


Fig. 3. Details of side, fan, and insulator of space heater

holes through mounting points in side section and attach with sheet metal screws.

8. Give final inspection and present for grading before disassembling and painting.

Conversion of Phono Motor

1. Remove bearing bolts from motor and carefully take out the armature leaving top bearing attached to armature shaft.
2. Clamp in vise and cut ¼-in. of 10-32 threads.
3. Clean all metal chips off carefully.
4. Reassemble motor.

Fabrication of Fan

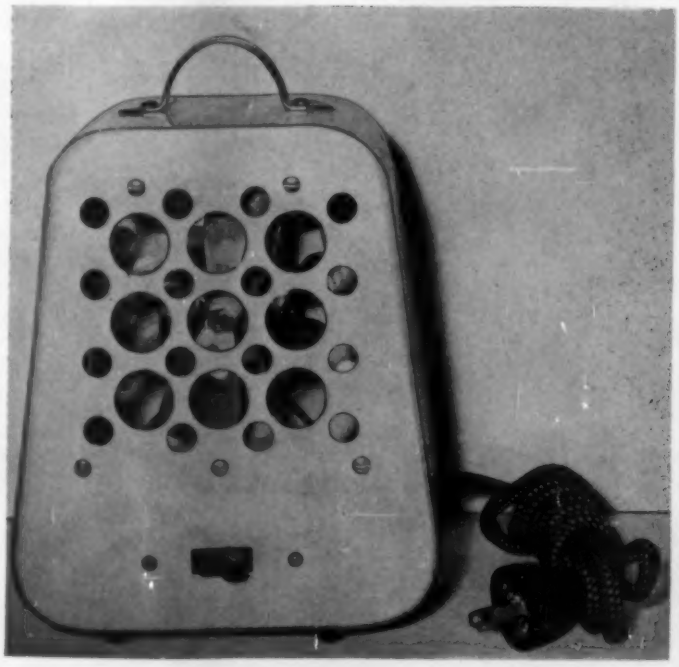
1. Obtain stock and make layout as shown in Figure 3.
2. Prick punch center hole and cut out along lines.
3. Polish on buffer.
4. File along edges until fan balances on scriber point.
5. Carefully locate under punch and punch out center hole.
6. Ascertain rotating direction of fan and bend desired curve over round bar. Be sure both curves are identical.
7. Mount on motor shaft between 10-32 nuts and operate.
8. Further adjust pitch, if necessary, to move air properly.

Fabrication of Heating Element and Terminals

1. Procure scrap aluminum and punch out eight ½-in. blanks.
2. Punch 3/16-in. holes in each of these blanks.
3. Layout fiber terminal strip as shown and punch, then cut.
4. Procure 24¾-in. mica disks and punch 3/16-in. holes in each. Punch one at a time.
5. Procure four 8-32 by ⅜ in. R.H. screws with nuts, and lock washers.
6. Assemble each terminal mount on front of heater with sufficient mica spacers to afford clearance of ¼ in. for heater coil when tightened firmly.

Winding Heating Element and Final Assembly

1. Uncoil nichrome wire. Fasten one end in vise and stretch one inch.
2. Procure mandrel and form coil in drill press.
3. Stretch to predetermined length so that a slight additional tension is necessary to place on terminals for permanent installation.
4. Use lock washers under all nuts.
5. Attach motor to back cover.
6. Mount switch.
7. Mount carrying handle. Cut off handle bolts if over ¾ in. long.
8. Attach motor leads to heating element posts. Use lugs for all connections.
9. Insert rubber grommet, line cord, tie knot for pull strain.



Portable space heater

10. Attach one end of 110 cord to switch, the other end to a terminal of the heating element.

11. Connect the remaining switch terminal to the remaining heating element terminal.

12. Attach the back cover, rubber feet, 110 volt plug cap, and it is ready for a trial run.

BILL OF MATERIALS

No. of Pcs.	Name of Part	Material	Size
2	Front and back sections	Cold rolled steel	24-ga. by 8 by 9 in.
1	Side section	Cold rolled steel	24-ga. by 4 by 28 in.
1	Fan blade	Aluminum, half hard	26-ga. by 2 by 5 in.
1	Insulator	Fiber insulation board	1/16 by 1 by 2 in.
4	Back cover (to attach)	Sheet metal screws	No. 4 by 3/8 in.
4	Bottom rests	Rubber bumper feet	Screw type
5	Heating element mounts	Machine screws with nuts	8-32 by 1 in.

Pieces of mica scrap for insulating element mounting screws

Metal carrying handle with mounting screws

Heavy duty phono changer motor for power

Wall type toggle switch, SPST. 10 amp., 110 volts

110 volt appliance cord with plug. Asbestos insulation.

Rubber grommet, 3/8-in. size

Standard nichrome wire hotplate heating element. 500 to 600 watt size.

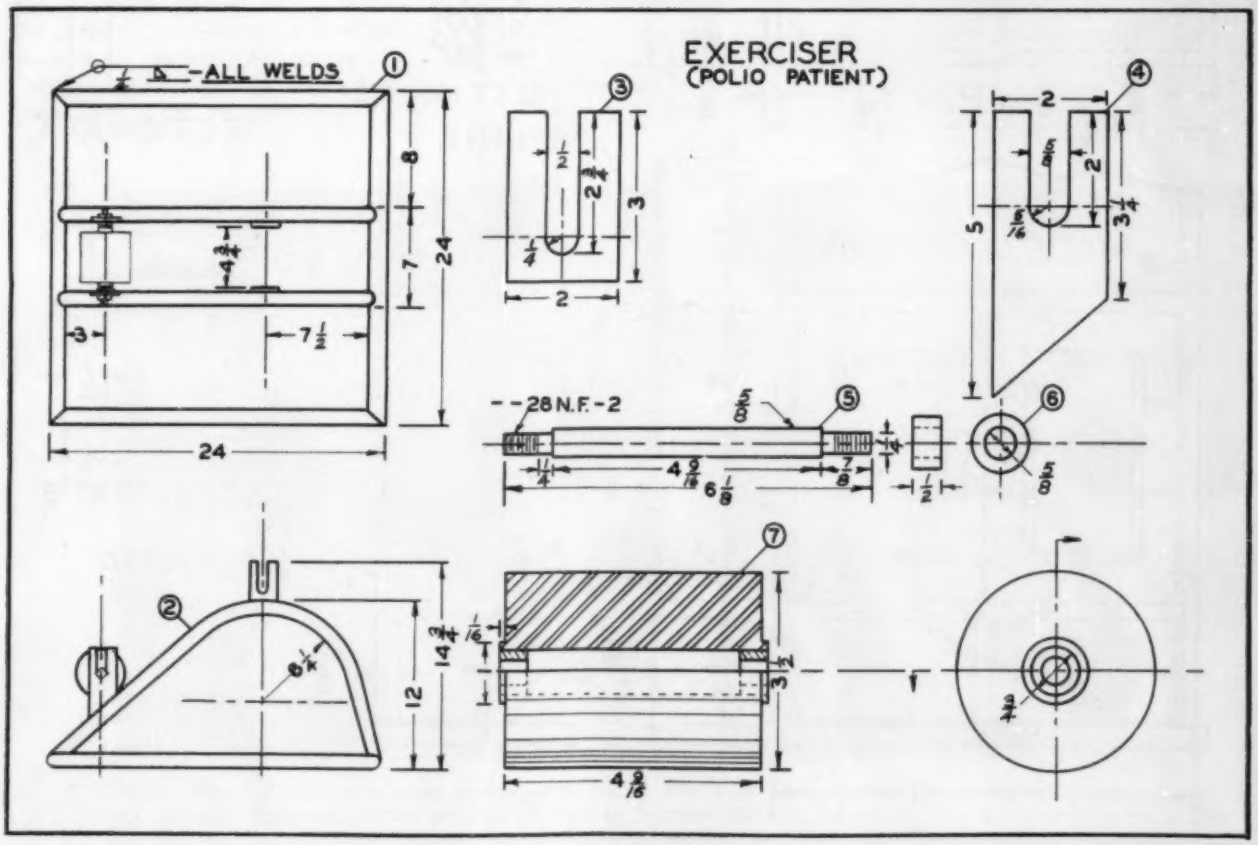
2 machine screws, 6-32 by 3/4 in. with nuts, for attaching insulating fiber

LEG EXERCISER

GEO. N. DUERKSEN
Instructor of Drafting
East High School
Wichita, Kans.

Some time ago the universally dreaded disease, polio, attacked the daughter of a

The leg exerciser in use



Details of the cycle

fellow teacher. The disease settled in the youngster's limbs. Exercising the legs was prescribed by the attending physician and bicycling was considered a good exercise. However, weather and street hazards confined this activity to a small room. The father, with the help of our high school welding instructor, conceived the idea of putting the bicycle on a stand.

The accompanying picture shows a pretty coed on the cycle which is mounted on a finished stand.

After the welding and machine-shop students finished the stand from the instructor's sketch, those shops requested that a drafting student make a drawing of the stand for our files and for publication.

The frame base (1) is of 1-in. o.d. tubing, mitered and welded at the corners. Next, the arches (2) were bent to the required shape and welded to the base. Parts (3) and (4) are mounts made of ⅛-in. steel plate; two of each of these are required. The former two are welded back to the inside edge of an arch which sets them 4¼ in. apart. This is the approximate outside space of the adjusting nuts of the rear cycle axle. A slot in the mounts allows for adjustment. The other two mounts (4) are also welded to the rear of the arches. Location on the arches will depend on the radius of the cycle's rear wheel.

The following parts are fabricated in the machine shop: Two brass bushings (6) which are ¾ in. o.d., and ⅜ in. i.d., are pressed into the longitudinal hole of a steel roller (7). The drilled diameter of this hole to be .748 d., or .002 smaller than the o.d., of the bushings to insure a press fit. The i.d. of the bushings should allow free movement on a ⅝-in. dia. axle (5). This subassembly is set in mount (4) which is welded to the arch so as to allow adjustment of the roller against the tire. The roller against the tire creates a similar resistance as the patient would experience when actually propelling himself on the bicycle along a level street.

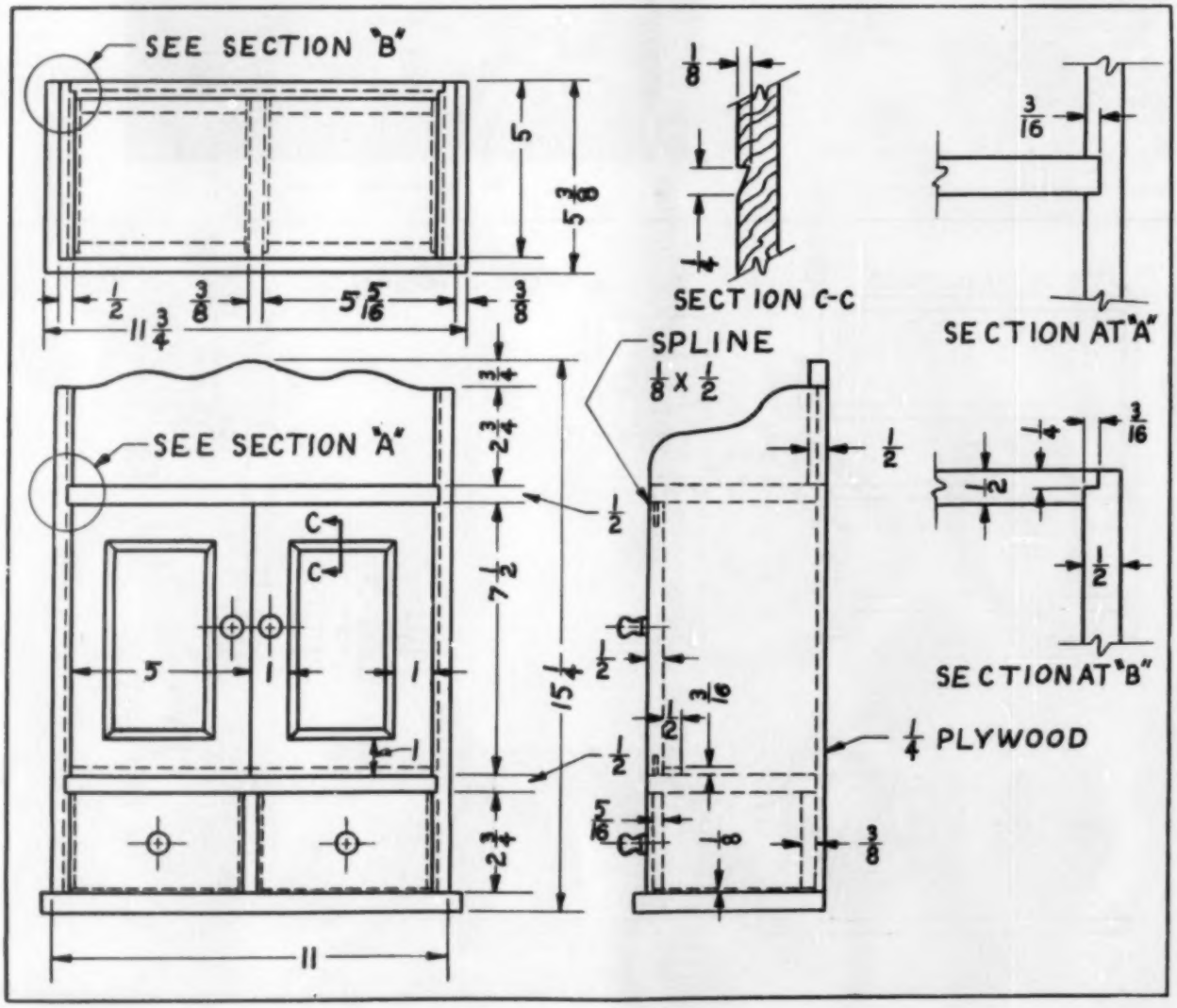
Finish: After all welds have been dressed flush and smooth, the entire stand with the exception of the roller is given two coats of aluminum paint.

This original model has since served two young people, who had polio, with definite success as a leg exerciser.

SPICE CABINET

CLAUDE E. NIHART
Formerly Professor
Los Angeles State College
Los Angeles, Calif.

The spice cabinet described here is an excellent project for 9th or 10th grade students. It incorporates a variety of interesting operations. If knotty pine is used,



Details of the spice cabinet

Spice cabinet
— Photograph by John La Monica, Los Angeles State College, Los Angeles, Calif.

the selection of pieces with small knots is important. The simulated panel is made by scoring with a sharp knife for the vertical cut and beveling with a skew-carving chisel for the angle cut. The spice cabinet in the photograph was stained with a diluted coat of flat white colored with a bit of raw sienna. After the stain was applied the knots were rubbed out with a soft cloth. Two coats of sealer followed by a coat of wax finished the job.

THE DRY MOUNTING PROCESS & INDUSTRIAL ARTS

FRED A. OLSEN
Washington Junior High School
Seattle, Wash.

In this age of increasing pupil enrollment and broadened courses of study, the industrial-arts teacher has difficulty in meeting the established industrial-arts objectives. In his efforts he employs many types of teaching aids to improve his

Fig. 1. The first step in dry mounting is to bond the corners of the dry mounting tissue to the back of the illustrative material. An electrically heated tacking iron is shown being used for that purpose
— Photographs by the author

Fig. 2. The dry mounting press permanently bonds the illustrative material to a heavier backing. About 10 seconds in the press is all that is required for this operation. Fig. 4. Large illustrations may be easily dry mounted to attractive poster board. Much of this interesting related information may be obtained without charge

teaching, both from the standpoint of teacher effort as well as pupil benefit. A time-saving and efficient method that will help serve this twofold purpose is the dry mounting process.

By definition, dry mounting is a means by which flat materials (project assignment sheets, plans, related information, etc.) may be mounted on heavier poster board or other stiff material without the use of any liquid bond.

While certain equipment and material have been used in my experiments, it is not the purpose of this article to advocate any particular manufacturer's product. Instead, the purpose of this article and accompanying illustrations is to convey to other instructors some possibilities of the dry mounting process as applicable to the industrial-arts program.

Fig. 3. Bonded materials may be sprayed with plastic or lacquer to insure neatness and longer wear

Needed equipment includes a dry mounting press, tacking iron, and paper cutter. Required materials are dry mounting tissue, stiff material for bonding and a sheet of clean paper for protection. An electric iron may be substituted for the press and tacking iron but not with comparable efficiency. Directions for mounting will not be included in this article as they are readily available from any manufacturer of dry mounting presses.

It is sufficient to say that this method eliminates the use of time-consuming, messy paste or glue. This in itself justifies the merit of the dry mounting process. Other advantages are as follows:

1. Dry mounted materials are both permanently fastened as well as being attractive in appearance.

2. The mounting process is simple. Elementary school children can do a commendable job of dry mounting with but little basic instruction and supervision. With such student help the teacher gains extra time for more important duties.

3. The dry mounting method is far faster than other bonding techniques. In a matter of seconds a project plan may be attractively mounted. This factor of speed is important where quantity must be considered.

4. Dry mounted materials are mounted permanently with little danger of separation from drying out. This is not true of pasted materials. Time-consuming remounting is thereby eliminated.

5. Dry mounted materials will wear better and stand more abuse than other methods of mounting. Students are often inclined to handle teaching materials roughly. Properly mounted materials may be flexed and abused in other ways with little danger of separation.

6. If a mistake in mounting has been made, the material may be removed quite easily. Simply reheat the mounted material without using the full pressure of the platen. Heat at a temperature of 300 degrees for about 20 seconds and the mounted material may easily be removed.

While the initial cost of dry mounting material and equipment may be a deterrent to its use, the factor of expense is surely subservient to the preceding advantages. While it would be impractical at the present time for each industrial-arts teacher to have this needed equipment in his shop, he should surely have access to it just as he does to the duplicator, projector, or typewriter.

Perhaps an even greater deterrent to its use is its comparative newness in the educational field. The dry mounting process has been known for a long time but has been used primarily by photographers. Only recently have teachers begun to realize the value of this process as it relates to their particular field. A little thought and experimentation can yield rich dividends for the industrial-arts teacher as well. This writer has by no means exhausted the ways this process may be used in the industrial-arts program. Several ideas, however, stand out as being time-saving to the teacher as well as beneficial to the students.

Project assignment sheets may be bonded to heavier material such as poster board or tablet backs. These sheets will last much longer in this way, and make storage much more convenient. For better wear and continued good appearance the mounted assignment sheets may be sprayed with plastic or lacquer.

Photographs and plans of sample projects may also be bonded to a heavier material. A source for photographs of sample projects are the state and national industrial-arts conventions. Such pictures may be mounted without any damage to photographic printing paper. These mounted photographs may be kept on file or in a loose-leaf notebook. If there is a planning area in the shop which is comparatively free from dust, the best of the photos may be kept in a salon rack. Illustrations and plans from magazines may be treated in the same manner. These may be brought in and the better contributions mounted by the students. In application, these mounted photos and plans will serve as inspiration for students planning their own projects.

Dry mounted photos, illustrations, and plans may be projected on a screen by using the opaque projector. By using this method of projection it is possible for the instructor to explain various aspects of good design, elements of construction, and detailed steps of procedure to the entire group at one time. While it is true that non-mounted plans and illustrations may be shown in the opaque projector, mounted materials are more easily handled, and projected more effectively.

Much of the valuable related information from corporations such as safety posters are not now used to greatest possible advantage. Such related material can be an asset to the industrial-arts program only if it can be used easily and effectively. For greater rigidity, these large cumbersome charts should be mounted on heavier backing. In the dry mounting process the width of the charts to be mounted is limited to twice the depth of the press. The length may be indefinite. Charts so mounted will subsequently be used more because of the greater ease with which they may be handled.

In mechanical drawing, supplemental plates are often used to complement those in the text. Unless these plates are printed on a stiff paper they soon become dog-eared from pupil abuse. An alternative is to have them duplicated on mimeo paper and then dry mount them to a heavier material. This latter method is easier as well as more flexible and will permit greater use of supplemental plates, thereby enriching the drawing program. The students' drawings may also be dry mounted to attractive poster board for display purposes. An attractive main hall display helps to advertise the industrial-arts program more favorably.

Here's a use for an old plate that the youngsters will enjoy. Have them get the autographs of their friends on separate strips of paper. Paste the strips to the plate and then coat the entire surface with thinned, white shellac that is fresh. — *Shellac Information Bureau.*

Today there are more than 58 million motor vehicles registered, one for every 700 feet of every lane in both directions on all streets and highways in the nation. — *Petroleum Newsnotes.*

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CAR INSPECTION FOR SAFETY

WILLIAM B. LaPORTE
El Rancho High School
Vocational Auto Instructor
Rivera, Calif.

An automotive safety inspection and registration program was recently inaugurated at El Rancho High School in Rivera, Calif., by the Boys' Council and vocational auto class. The Boys' Council, which handles minor student disciplinary action, was in charge of the registration. The vocational auto class, which is a three-hour apprentice program for auto mechanics, made the safety inspections. All faculty and employee cars were registered and issued decals. Students were given their decals only after their cars had passed the safety inspection.

Reasons for: There were two major reasons for initiating this registration and safety-check program at El Rancho High School.

First, two El Rancho High School students had been killed in 1956 due to faulty mechanical equipment on their cars, while another boy was seriously injured.

Second, as a public school, El Rancho felt an obligation to the community and its students to fully educate them in all phases of auto safety and good citizenship.

Aside from these two main purposes there were several others: one, to help with the identification of outsiders who bring their cars on campus; another, to improve public relations. With all cars registered, neighbors and other citizens are now able to help the school identify students using their cars illegally, dangerously, or causing trouble. This also has had the positive effect of proving to the community that most of the offenders on streets near the school are not El Rancho students.

Registration, Enforcement, and Operation: This plan was suggested by the student government and is operated by the students with the approval and support of the administration. Offenders who prove un-co-operative are dealt with by the administration on request, by the Highway Patrol. The Boys' Council supervises registration and is responsible for counseling violators, insuring continued success of the program, selecting students to check for violators and referring any such who are un-co-operative to the dean of boys for further action.

The vocational auto shop students are responsible for conducting safety checks on all automobiles involved in the program. This includes administering the initial and periodic safety checks, suggesting and approving correction on equipment, and also making periodic checks to be sure that registered cars remain in safe condition. Final approval on equipment is made by the vocational auto instructor. The student government organizations which approved this plan and provided the necessary funds are responsible for: supporting the plan; evaluating its success; publicity; helping students understand its need and value; helping enforce the plan; and encouraging violators to co-operate.

Law-Enforcement Co-operation: In the planning stages of this program, both the Boys' Council and the Vocational Auto Class received the aid and encouragement of California Highway Patrol officers. One officer visited the vocational auto class and assisted in drafting the safety-inspection check sheet that was used. Not only did he quote the law but he explained why the laws are made and the effect they have on the driver and owner of a car.

This type of plan was praised highly by the representatives at the October Governor's Traffic Safety Conference. Highway Patrol officers recommended a program of this type to all high schools, and El Rancho is one of the first to put it into practice.

Enforcement on Campus: The Boys' Council and student leaders have determined, with administrative approval, that enforcement is to be achieved by having individuals and student groups patrol the parking lots. Also the regularly designated faculty grounds supervisors are patrolling the parking lots. The Highway Patrol offers guidance and information when necessary and extends the program into the community adjacent to the high school. They take care of any unusual cases referred to them by the students. Individuals who do not conform to the regulations lose the privilege of bringing their cars to school.

Safety Test: The safety test was conducted on the student parking lot during the morning on two consecutive days. The vocational auto students did all of the actual testing and inspecting, with the instructor giving the final approval or disapproval. Approximately 200 cars were inspected, with about 65 per cent of them passing. Of those failing, 45 per cent had faulty lights, 25 per cent faulty brakes, 9 per cent bad tires, 4 per cent no horn, 4 per cent missing one or more license plates, 4 per cent cracked glass, 4 per cent no windshield wiper, and 3 per cent no rear-view mirror. Of those inspected, none were found to have a faulty steering gear. Also it was found that over 90 per cent of them had insurance on their cars. For the brake test the cars were driven at 25 miles per hour and were required to stop within two lines, 20 feet apart. The brakes were applied at the first line and the cars were required to stop before reaching the second line. This is the same test that is used by the California Highway Patrol.

Student Reactions: At the present time very few students have voiced objections to this program. Most of them are glad to have their cars inspected and the faults corrected. Not only does it make their driving safer, but it probably prevents them from receiving traffic citations for faulty equipment. Many of the mechanical items found faulty are repaired in the vocational auto shop, by the same students that do the inspecting.

It is hoped that the foregoing information will be of value to other schools in helping them to set up a car registration and safety check program. It is the author's firm belief that a program of this type should be conducted at all schools, thereby helping to reduce the needless killing that is taking place on our highways today.

BUY AN OLD HOUSE OR BUILD?

ELDON W. DANNE
Industrial Arts Department
Westmar College
Le Mars, Ia.

There are many factors that determine the price of a house, new or old. The forces of supply and demand are constantly at work. With a knowledge of what to look for, one can do a better job of examining and judging a house you may be considering to buy. With knowledge of construction details you will acquire and list your findings. For professional advice you should take the list to your contractor and ask him to make an estimate of repairs on any immediate modernizing you might want done. Compare that total estimate plus the sales price of the house with the cost of building a new house of similar size. If it costs more to build a new house than to bring an old house up to date, one will have a sound reason for buying instead of building.

CHECK LIST

The Outside View

1. Roof — Look at the roof lines. If there is sagging here it is a serious structural defect and very difficult to remedy. Note the condition of the shingles.

2. Chimney — Are there bricks or mortar missing from the chimney? In-

(Continued on page 32A)

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PERSONAL NEWS

(Continued from page 10A)

a B.S. degree, and the University of Chicago where he was awarded the degrees of M.A. in Public Administration and Ph.D. in Educational Administration. While at the University of Chicago, he was Director of Alumni Association. He also attended the University of Vermont and the U. S. Naval Academy Postgraduate School at Annapolis.

Dr. Nottenburg served as a U. S. Navy officer in the European and Middle East theaters during World War II.

♦ HERBERT W. YANKEE, formerly an instructor of drafting and mathematics at the High School, Stratford, Conn., is now assistant professor of mechanical engineering at Worcester Polytechnic Institute, Worcester, Mass. This transfer is effective with the opening of school in fall, 1957.

♦ DR. HARRY A. GRACE, formerly dean of men at Grinnell College, Grinnell, Iowa, has been appointed an associate dean of students in charge of guidance and testing at the San Luis Obispo home campus of California State Polytechnic College.

Dr. Grace did his undergraduate work at Ohio State University and obtained his Ph.D. in psychology at Columbia University. During World War II he was an army intelligence officer assigned to the European theater where he taught German for espionage agents going behind enemy lines.

Prior to his two years at Grinnell as dean of men, he was a psychology faculty member at the University of Illinois and at Michigan State University, where he initiated that school's first course in student leadership.

♦ DR. ROBERT E. TURNER, who received his doctorate at the University of Missouri in August, joined the industrial education department faculty at Northwestern State College, Natchitoches, La., beginning with the fall term. His position is in the development of a program in electronics. It is the plan of the department to initiate a technical program in this and some allied areas during the coming year.

♦ CHESTER H. GAUSMAN, formerly electronics instructor at Lincoln High School, Lincoln, Neb., has been promoted to co-ordinator of industrial arts and trade and industrial education of the Lincoln Public Schools.

Mr. Gausman received his doctor's degree from the University of Wyoming in 1955.

♦ ROBERT A. STEFFES will be assistant professor of journalism, Fresno State College, Fresno, Calif., effective in fall, 1957. He has been on leave for the past year from Bowling Green State University, Bowling Green, Ohio.

NEW SPARTAN MODEL 24

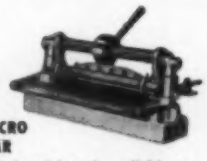
A DI-ACRO BOX AND PAN BRAKE

FORMS BOXES AND CHASSIS WITH UP TO ½" FLANGE

The Spartan's new design and rugged construction was planned specifically for school shops. Hardened Box Fingers are undercut to allow the forming of chassis and boxes as deep as 3" with lipped edges as large as ½" across. Material clearance of 1" between the Box Fingers and the Bottom Plate allows for easy insertion and removal of material. The Spartan bends 16 gauge mild steel up to 135° in one operation. It can also be used as a radius former and bar folder. An adjustable back gauge and a simplified stop control are standard equipment, *available in 24" width only.*

SPARTAN MODEL DI-ACRO ROLLER

Built exclusively for school shops in five widths, 12" to 36", all with 2" machined rolls. Form smooth cylinders with radii of 1" and larger in sheet metals up to 16 gauge. Heavy welded steel and cast construction.



DI-ACRO SHEAR

An industrial tool available to schools in 6", 9", 12" and 24" widths. Capacity 16 gauge steel.

DI-ACRO BENDER

Available in five sizes that form bar stock, flats and tubing in a minimum of change-over time.

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News Notes

NEW EDITION OF OCCUPATIONAL OUTLOOK HANDBOOK

A new, illustrated edition of the Occupational Outlook Handbook was released jointly by Secretary of Labor James P. Mitchell and Administrator of Veterans' Affairs Harvey V. Higley, as announced on September 22, 1957.

The 1957 edition of this basic and popular guide to employment opportunity, prepared by the Department's Bureau of Labor Statistics, describes more than 500 occupations and 25 major industries. It includes for the first time many expanding fields of job opportunity such as electronics, physical and biological sciences, atomic energy, radio and television broadcasting, and social sciences. All industries and occupations covered in the 1951 edition have been completely revised.

Long in use by school and vocational counselors, by the Veteran's Administration, and by the State Employment Services affiliated with the United States Employment Service, the Handbook provides a wealth of information to help a person choose a career. The nature of the work in each job, the qualifications needed, the earnings to be expected, the employment outlook, and other job factors combine to present an accurate and comprehensive view of job opportunities in the United States.

Copies of the 700-page book are available at $4 each from the *Superintendent of Documents, Washington 25, D. C.*

The Occupational Outlook Handbook will now be issued every two years. Each edition will incorporate the results of all the research that has been conducted up to the date of its issuance.

Each chapter or section of the current Handbook will be available separately as a reprint for those who prefer to keep their occupational materials in vertical files or looseleaf notebooks. This will also make it possible for someone interested in only a single occupation or industry to purchase the chapter on that field at much less cost than the whole Handbook, or for schools to purchase a supply of the sections on occupations or industries most important in their communities.

A new periodical, The Occupational Outlook, is now being published. Annual subscriptions — 4 issues a year — can be pur-

(Continued on page 24A)

PERFECTION IN LETTERING: K&E Leroy® Lettering Equipment is the engineer's short-cut to a perfect lettering job.

The student's version is the popular, economical K&E DORIC LETTERING SET. It provides clean, perfect, uniform lettering right from the start, without need for special skill or training. The set includes a template (with three sizes of letters and numerals), pens in two line widths, scriber, pencil lead holder, ink and straightedge. The set is handsomely boxed in a compact, long-wearing case.

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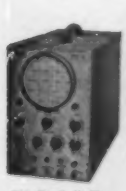

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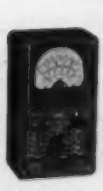

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NEWS NOTES

(Continued from page 22A)

chased for $1 from the *Superintendent of Documents, Washington 25, D. C.* It summarizes the results of new studies and reports the latest developments affecting occupations and industries covered in the Handbook. It also contains general articles on trends in employment, education, and training, and other subjects affecting the occupational outlook. Each issue of The Occupational Outlook contains a cumulative index to all of the issues published since the most recent edition of the Handbook. All of the new material will then be incorporated in the following edition of the Handbook.

INDUSTRIAL-ARTS WORKSHOP

Industrial-arts teachers from three states attended a special industrial-arts workshop on the campus of Stout State College all day Friday, October 4. The event was held in conjunction with Stout's homecoming as a convenience to alumni who thus had an opportunity to attend both events.

Participants from Wisconsin, Minnesota, and Illinois saw demonstrations and heard talks in four fields of industrial arts, announced George Soderberg, associate professor of industrial education at Stout State College and general chairman of the event.

Dr. David P. Barnard, head of Stout's audio-visual center, addressed the group on "New Teacher-Made Audio-Visual Production Techniques." Miss Martha Ruth Amon, chairman of the related arts department at the college, described "Ceramics: Forming, Firing and Decorating of Clay."

"Gem Cutting and Polishing" was the topic of Guy Long, industrial-arts instructor of the Chippewa Falls schools. Marvin Kufahl, instructor in the metals department at Stout, explained new techniques in "Metal Spinning."

A luncheon and tours of the campus were included in the all-day workshop program.

NEW BOOKLET ON FIRE PREVENTION

The National Safety Council announces their new publication "This'll Burn You Up." The publication, in a format resembling a book of matches, says a fire can (1) put you out of work, (2) put you in a hospital, or (3) cause your death.

The "book of matches" booklet, in an attempt to point up the seriousness of fires, notes that every day fires claim 17 lives, hundreds of jobs, $800,000 in industrial property—all because of carelessness.

Single sample copies of "This'll Burn You Up" and information on quantity prices may be obtained from the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

SHORT COURSE IN GAS MEASUREMENT HELD

North Carolina State College recently welcomed 75 students to its first gas measurement short course held during late August in the Riddick Engineering Building on the college campus.

The course was officially opened by Dr. Edward M. Schoenborn, Jr., head of the college's Department of Chemical Engineering, and chairman of the education committee of the Southeastern Gas Association. Murray S. Hitchcock of Atlanta, Ga., director of the Southeastern Gas Association and District Manager for American Meter Company, presided over the opening session.

The students, representing eight different states, heard discussions of domestic, com-

mercial, and industrial meters and regulators of gas installations. The group also covered maintenance and design of these installations.

The newly organized course was sponsored by the Southeastern Gas Association and was conducted by the State College Department of Chemical Engineering. Instructors for the two-day program included representatives from industry manufacturers, as well as staff members of the college's School of Engineering.

FIFTH ANNUAL CONFERENCE

The Ball State Teachers College 5th Annual Industrial Arts Conference will be held on Saturday, November 16, 1957, in the Student Center and the Practical Arts Building of the Ball State Campus.

The theme of the conference will be "Your Future in Industrial Arts."

Dr. John L. Feirer, head, industrial-arts department. Western Michigan College, Kalamazoo, Mich., will be the speaker at the morning program, and will speak on "Your Future Through and in Industrial Arts."

A luncheon program is provided for the noon hour.

Demonstrations, exhibits, and other events of interest will feature the afternoon session.

Jake Reams, an instructor of the Ball State Industrial Arts Department, will act as master of ceremonies for the day.

♦ The U. S. Atomic Energy Commission has accepted 62 scientists and engineers, 50 of them from 21 foreign countries, for enrollment in the Sixth Session of the Commission's International School of Nuclear Science and Engineering at the Argonne National Laboratory, Lemont, Ill. The training program, an outstanding part of the President's "Atoms-for-Peace" program is shared by the International School and co-operating universities, North Carolina State College and Pennsylvania State University.

The enrollment brings to 355 the number of scientists and engineers pursuing the course in unclassified reactor technology. Of these, 267 have come from 42 foreign countries. The 88 American students have been sponsored largely by United States firms interested in nuclear energy.

Nations represented in the tentative roster of the Sixth Session Class include: Afghanistan, Austria, Brazil, Burma, Nationalist China, France, Germany, Greece, India, Indonesia, Israel, Italy, Japan, Korea, Mexico, Netherlands, Pakistan, Peru, Spain, Switzerland, and Thailand.

The course is based upon lectures and seminars and the intensive training provides a general grounding in nuclear science for those participating. Practical work then follows.

After a week of general orientation the students were divided into two groups and these report at Raleigh, N. C., and State College, Pa., for the broad training program presented in the first 17 weeks of their study. The International Cooperation Administration and the Department of State provide support for many of the foreign students.

♦ The National Safety Council have issued Data Sheet D-299 — "Grounding of Portable Electric Equipment" — one of many prepared periodically by safety engineers. It contains information on grounding portable electric equipment. Here are some suggestions to be found in the booklet:

1. When wiring is enclosed with metal conduit or protected by armored cable, all couplings and fittings used to make connections between the conduit or cable and the electrical equipment should provide metal-to-metal contact to assure a continuous ground return.

(Continued on next page)

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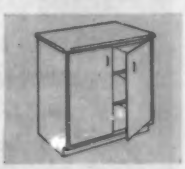

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NEWS NOTES

(Continued from previous page)

2. If the wiring is nonmetallic sheathed cable or knob and tube work — such as is used in construction work — a third wire must be connected to the grounding terminal on the receptacle to provide a good conducting path to a grounding electrode or water pipe.

3. Grounding wires should be checked to see that the size is correct for the capacity of the nearest fuse or other automatic cutout.

4. No fuses, automatic cutouts, or hand-operated switches should be inserted in a grounding line.

To ensure automatic use of the ground, a common type of plug with a U-shaped grounding blade and two standard parallel polarized blades now can be used.

National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

♦ The Cooper Union for the Advancement of Science and Art has been presented with a gift of $100,000 by Miss Doris Duke as a memorial to her father, the late James B. Duke. It was made for the unrestricted use of The Cooper Union and has been placed in the Centennial Development Fund, which will be used to construct a new engineering school building and to strengthen the educational program of the tuition-free college that Peter Cooper founded in 1859.

After nearly 100 years of service in New York City, the Cooper Union remains the nation's only private college of art and engineering that offers day and evening courses entirely free of tuition to selected students.

New Publications

Human Relations in Business

By Keith Davis. Cloth, 557 pp., 6 by 9¼ in., illus., $6.50. McGraw-Hill Book Co., Inc., New York, N. Y.

This is an excellent textbook for students and others who want to learn about the problems that confront employers and employees. The book is especially aimed at helping students in acquiring a grasp of how to develop programs for training courses for management, self-study, and for adult training classes for developing supervisory employees in business and industry.

Part 1 of the book discusses the art of human relations and how to set up human relations programs.

Part 2 presents six chapters which present people in their work environment, human relations and formal organization, staff and other functional relationships, informal organizations, the labor union, and change and the quest for security.

Part 3 consists of 15 chapters which discuss leadership, supervision, human relations training, role playing, communicating with employees, communication groups, meetings and group dynamics, development of participation, wage administration, wage incentives, organization structure and charting, procedures and work systems, employee counseling, human problems with special employment groups, collective bargaining and grievance systems, morale and its appraisal, and trends in human relations.

Part 4 presents 14 actual case problems.

Machines for Power Farming

By Archie A. Stone and Harold E. Gulvin. Cloth, 616 pp., 5⅝ by 8⅜ in., illus., $5.95. John Wiley & Sons, Inc., New York, N. Y.

This text assists the student of agriculture in colleges and vocational schools to get a good idea of our modern farm machinery, and helps them acquire the knowledge needed for proper selection, maintenance, and use of this type of machinery.

It contains 8 chapters which discuss power production; primary tillage; seedbed refining, application of fertilizer; planting and seeding; control of woods, insects, and disease; harvesting; and management.

A number of questions and discussion problems will be found at the end of each chapter.

Practical Exercises in Proofreading

By Robert M. Smith and Robert A. Steffes. Paper, 8⅜ by 10⅞ in., illus., $1.25. Kenilworth Press, Glen Ellyn, Ill.

This workbook consists of 16 galley proofs printed by the letterpress process. This will give students who are studying proofreading an excellent opportunity to get firsthand practice in this work, especially since the copy from which the material was set accompanies the proofs.

Assignments 1 to 9 inclusive present the proofreading of straight matter. Assignments 10 and 11 are devoted to the proofreading of poetry. Metropolitan newspaper straight matter is covered in assignments 13 and 14, and editorial page features and canned fillers are the subjects in assignments 15 and 16.

The Art of Making Mosaics

By Louisa Jenkins and Barbara Mills.

(Continued on page 28A)

Desk-Topper drafting machines at Lakewood High School, Lakewood, Ohio. Glenn Scott, Instructor. Installed by Cleveland Blue Print & Supply Co.

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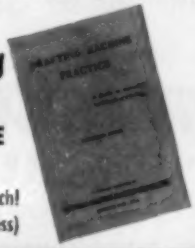

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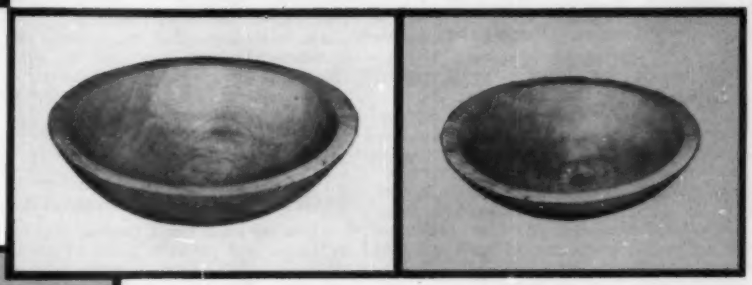

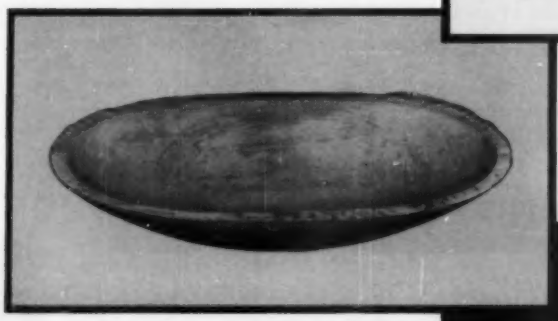

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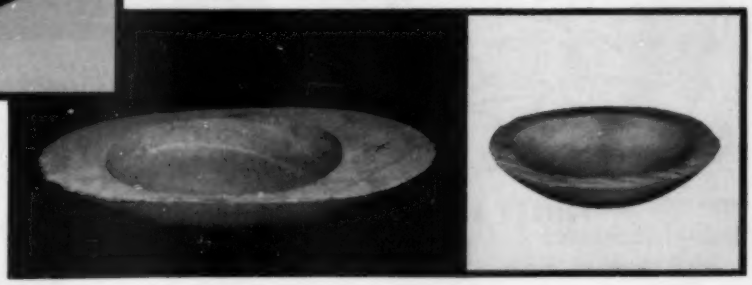

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NEW PUBLICATIONS

(Continued from page 26A)

Cloth, 132 pp., $5.95. D. Van Nostrand Co., Princeton, N. J.

The ancient art of making pictorial mosaics is one which will interest professional artists and advanced amateur craftsmen. Mosaics are logically a form of ornament in modern architecture and can provide dignified as well as most interesting features in public buildings and homes. If properly designed, they provide a splendid outlet for children's artistic inclinations and offer opportunities for valuable permanent memorials in schools.

The present book outlines the methods of making the leading types of mosaics, suggests applications, and urges the study and development of original designs. Sufficient simple projects are suggested in the book to make it valuable for secondary school arts and crafts departments.

Blueprint Reading and Sketching for Carpentary Trades — Residential

By Leo P. McDonnell. Paper, spiral binding, 200 pp., 8 by 10¾ in., illus., $2.50. Delmar Publishers, Inc., Albany, N. Y.

An advanced text-workbook which will be of value to the mason, carpenter, plumber, electrician, and others in the building trades.

The course described in this workbook consists of 24 units, which inform the learner or reader about specifications, dimensions, scale and working drawings, elevation drawings, wall sections — elevations, and how to interpret the elevation drawing.

Unit 7 shows how to draw the plot plan. Then follow the foundation drawings, plan symbols, schedules, basement plan, floor plan, and roof frame plan.

There also are details for the cornice, walls, windows, doors, dormers and louvers, stairs, fireplaces, cabinets, and quantities and material lists.

The appendix contains the specifications for preparing the site, excavations, masonry materials, concrete work, brick work, stone flagging, dampproofing, metalwork, plastering, tile work, carpentry, painting and finishing, and rough and finish hardware.

How to Build Modern Funiture

By Mario Dal Fabro. Cloth, 214 pp., 7¼ by 10 in., illus., $4.95. F. W. Dodge Corp., New York, N. Y.

This is the second edition of this book. It is well illustrated with numerous line drawings that may be easily read by the home craftsman and the do-it-your-self worker who must depend mainly upon himself in his efforts to select the proper material, assemble, and join the various parts that make up the pieces of furniture that the craftsman wants to make. It also explains how to upholster and finish furniture so that it blends well with existing home surroundings.

The book consists of two sections, the first of which discusses wood and its properties, the joints used in woodworking with plywood, making doors, shelves, drawers, etc., and using materials other than wood.

Section 2 presents 53 excellent furniture designs which will please most every craftsman.

Student Notebook in Industrial Arts

Cloth covered, spiral binding, 8¼ by 10¾ in. Cover and contents, $1.70. Cover or contents separately, 85 cents each. Published by Interstate Printers and Publishers, Inc., 19 N. Jackson St., Danville, Ill.

The material in this notebook consists of approximately 115 sheets of forms for use in industrial-arts classes. Ten, 5-cut divider sheets also are included.

These forms contain safety rules, a schedule sheet, assignment sheets, class and reading notes, student project plan, sheets for outline procedures, and test for workmanship.

Engineering Manual for Control of In-Plant Environment in Foundries

By American Foundrymen's Society. Cloth, 145 pp., 8½ by 11 in., illus., $7.75.

This book focuses attention to health, ventilation, and comfort consideration in both large and small plants.

The book contains both the general background information and specific design data for making foundries a better place to work. Materials and processes that influence health, ventilation, and comfort are discussed and their characteristics are identified. Ventilating systems are described generally and then specifically with data furnished for the design of exhaust hoods and exhaust systems.

Particular problems in foundry operations are discussed and remedies are given in chapters that cover sand handling, molding and core making, melting and pouring, radiation, cleaning room, welding, woodworking, and dust and fume collectors.

Basic Physics, Vols. 1 and 2

By Alexander Efron. Cloth, 724 pp., 6¼ by 9½ in., Smythe sewn, illus., $8.95.

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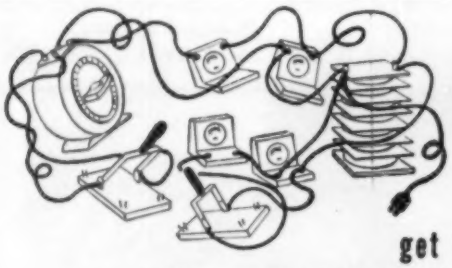
(Continued on page 30A)



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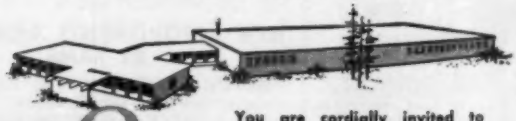

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15	18"Lx5"Wx2½"H	21"Lx7"Wx3½"H
16	30"Lx5"Wx2½"H	32"Lx7"Wx3½"H

No.	Wattage 115 Volt	Shipping Weight	F.O.B. Phila.
15	200 W	4 lbs.	$22.50
16	350 W	6 lbs.	35.00

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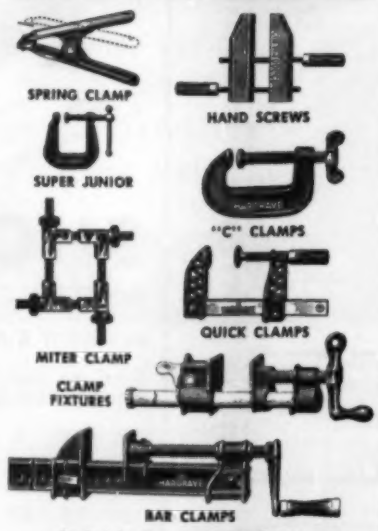

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THE CINCINNATI TOOL CO.

Waverly & Main Cincinnati 12, Ohio

NEW PUBLICATIONS

(Continued from page 28A)

descriptive in its make-up and Volume 2, more searching and mathematical. The books are rigorous technically, completely modern, yet generate and maintain student interest.

Special effort has been made to make the course self-teachable. Profuse, selected illustrations (over 800 are used) throughout; basic demonstration experiments are described and model problems of graduated difficulty are to be found at the end of each chapter. The content of this course satisfies the requirements of all college boards as well as all local, regional, and state syllabi.

Geology and Ourselves

By F. H. Edmunds. Cloth, 256 pp., 6¼ by 9¼ in., illus., $10. Philosophical Library, New York, N. Y.

The author, himself a noted geologist in Great Britain, presents a very interesting book on the history of the earth, and of the minerals, rocks, fossils, mineral oils, and natural gases which make up the structure of the earth.

The 16 chapters of the book present excellent discussions on the following subjects: the beginnings of geology; geology today; minerals, rocks, and fossils; the history of the earth; geological surveys and maps; geophysics and geochemistry, bored wells and trial holes; water supply; building materials; civil and structural engineering; coal and coal mining; ores — prospecting and mining; mineral oil and natural gas; geology and agriculture; planning, mining subsidences, and other matters; and geology for the amateur.

Business and Personal News

CHANGE IN PLANT MANAGERS

Black & Decker Manufacturing Company have announced three major manufacturing appointments. They are: John M. Fox, Hamstead plant manager; Karl B. Salanda, director of industrial and plant engineering; and Wm. B. Ford, Jr., Towson plant manager.

Messrs. Fox, Salanda, and Ford are all responsible to Adam Quick, vice-president in charge of production.

YATES-AMERICAN ANNOUNCES NEW BRANCH LOCATION

Consolidation of the High Point, N. C., and Memphis, Tenn., branch offices was announced recently by Yates-American Machine Company, effective in mid-September.

The new Southern branch at Atlanta, Ga., was chosen because of its advantageous position in serving South Central and Southeastern customers. In addition, more complete stocks of repair parts and supplies can be maintained at the new location.

The main plant is located in Beloit, Wis., and other offices are maintained in Portland, Ore., and Chicago, Ill.

NEW APPOINTMENTS ANNOUNCED BY SAMS

Howard W. Sams & Co., Inc., has announced two new appointments.

Jack W. Merritt, previously Sales Manager of the Photofact Division, has been appointed Sales Manager of the newly formed Electronic Distributor Division.

Walton G. Wilson has been named Sales Manager of the Industrial Service Division filling the vacancy created by the appointment of Joe H. Morin to General Sales Manager.

THE STANLEY WORKS ESSAY CONTEST

Some 1500 educators and 500 industrialists in all of the 48 states are receiving a report on the functioning of an essay contest on the subject, "The Role of Industry in the Development of America," designed to link industry and community and to encourage among high school students an appreciation of the nation's industrial history.

The contest, sponsored by the 115-year-old Stanley Works, of New Britain, Conn., was held during the academic year 1956–57. Members of the senior class of New Britain High School participated for $1,100 in prizes contributed by the company.

In a handsome brochure now being distributed, the background and methods employed in the contest are described. These included an exhibit of hand tools old and modern, and the establishment of a shelf of industrial literature in the school library contributed by firms nationwide — histories, brochures, and other material.

A faculty committee administered a schedule based on college standards. This included conferences with the students as a group and individually, preparation of outlines, development of theme, supervision of research, and other details.

The brochure includes the essay that won first prize, written by 17-year-old Judith Neuhart. She wrote on "The Role of the Steel Industry in the Development of America." It also includes a list of the literature included in the special shelf.

DeWALT NAMES NEW SALES EXECUTIVES

DeWalt Inc., subsidiary of American Machine & Foundry Company, and manufacturer of woodworking and metal cutting equipment for home and industry, has appointed three new sales executives, as announced by Conde Hamlin, DeWalt president.

All positions are newly created in accordance with company policy to keep pace with company growth and the increased importance of creative selling.

Thomas E. Barry has been appointed assistant general sales manager in charge of field sales personnel training and development. In addition he will be responsible for dealer personnel training in connection with dealer schools conducted by DeWalt.

C. B. Hull, III, has been named assistant general sales manager, responsible for internal sales operations. He will also serve as an adviser to management on market conditions and general sales policy. He will be at the home office in Lancaster, Pa.

Marlin R. Boyer has been named to the position of sales promotion manager, and will be responsible for the co-ordination of DeWalt product promotion at national trade shows and exhibits, and deployment of salesman-demonstrators as part of a new sales plan for DeWalt dealers.

APPOINTMENTS TO SALES STAFF

William E. MacLachlan, eastern regional school specialist for Rockwell Manufacturing Company's Delta Power Tool Division, has been promoted to the newly created post of assistant manager-school sales with headquarters at Pittsburgh.

The appointment was announced by John Claude, national school sales manager.

A native of Augusta, Wis., and 1949 industrial arts graduate of Stout State College, Mr. MacLachlan taught industrial arts for

(Continued on page 34A)

SAMS BOOKS are the most widely used publications for effective instruction in RADIO, TV, ELECTRONICS & ELECTRICITY

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BASIC ELECTRICITY MANUAL

Outstanding course in electricity, planned to achieve maximum teaching effectiveness. Consists of 36 Lessons in Practical Electricity, covering basic theory, laws, terms, magnetism, motors, transformers, lighting, telephones and dozens of other subjects. Includes 13-Projects Section, outlining simple, inexpensive projects which demonstrate theory in action in a practical, interesting way. 264 pages; profusely illustrated; 8½ x 11". Order *ED-12*, only.....$3.00

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BASIC TELEVISION MANUAL

Invaluable training course for TV instruction. 24-Lesson Section covers oscilloscope principles and application; power supplies; FM carrier waves, discriminators, ratio detectors; antenna principles and design; TV receivers; RF amplifiers and tuners; Video IF, detector, AGC and sweep circuits; cathode ray picture tubes, etc. Project Section includes nine basic projects translating theory into actual practice and so designed as to sustain interest. This effective TV manual contains 280 pages; 7½ x 11"; fully illustrated. Order *ED-21*, only.....$5.00

COLOR TV TRAINING MANUAL

For advanced students. Covers principles of the Color TV system, including colorimetry, make-up of the color signal; Color receiver circuits (chapters on every type of circuit used in the receiver); Color receiver servicing, including setting up the Color picture tube, alignment, trouble-shooting, test equipment required; also valuable appendices containing equations, vectors, color blocks and colorplates. A comprehensive Color TV training course. 260 pages; 8½ x 11"; profusely illustrated. Order *TVC-1*, only $6.95

PHOTOFACT TELEVISION COURSE

A complete, simple explanation of modern Television principles, operation and practice. Covers Cathode Beam Formation and Control; Beam Deflection Systems; Beam Modulation and Synchronization. Includes analysis of CR tube construction, camera tubes, voltage supplies, saw-tooth generators, sync circuits, control functions, receiving antenna circuits, RF input tuning systems, IF systems, AGC, etc. Fully illustrated; 208 pages; 8½ x 11". Order *TV-1*, only.....$3.00

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BUY AN OLD HOUSE OR BUILD?

(Continued from page 20A)

spect the ground and foundation supporting the chimney for deteriorating concrete.

3. Flashing — Be sure rustproof metal flashing is used around the chimney, vent pipes, skylights, and to line valleys.

4. Eaves — Are the eaves straight? Check the presence and condition of gutters and downspouts.

5. Tight Siding — Siding should be laid evenly with overlapped and tight butt joints, with metal cap corners. Tight nails indicate sound framing underneath. Note the paint job; observe if the paint is peeling, chalking, or blistering.

6. Exterior Walls — Check the condition of the paint and joints. Blistering may be caused by faulty insulation.

7. Windows — Are the windows plumb and level?

8. Sills — Is the sill, where the house framing meets the foundation, level?

9. Porches or Steps — Is the porch or the steps sagging away from the house?

10. Termites — Look at the top of the foundation walls for muddy termite trails to the beam ends.

11. Drainage — Is the house susceptible to run-off from higher ground? Is the foundation damp?

12. Walks and Driveways — Check for large cracks in concrete and note if there are expansion strips. Note also if they are well drained and aren't too steep.

13. Garage — Is there a garage? If there is a garage, how large is it? It should have some storage shelves with perhaps a small bench built in.

14. Boundaries — Dig up the lot marker and be assured that the house it sitting on the lot properly.

15. Ground Improvements and Planting — Such items as walks, drives, retaining walls, fences, incinerators, clothes line poles, landscaping and trees add to the livability of the house.

The Basement View

1. Foundation — Foundation walls should be supported by footings large enough to bear the weight of the house. Cracks in the basement wall will give clues to whether the footings are strong enough. Water rings on the walls are evidence of flooding in the past. Foundation walls should be from 8 to 14 in. thick depending on the size of the house and the material of which it is made.

2. Joist Structure — The joists should be at least 2 in. thick, the depth depending on the span, spaced 16 in. apart from their centers, or closer on spans over 14 feet. When joists are spliced, they should have a generous overlap and spliced only over a support. Too many knots can seriously weaken the joists.

3. Girders — Girders are large beams which support the inner ends of the joists. The support posts should rest on concrete footings. Check the entire structure for sag.

4. Subfloor — There should be a subfloor. Flooring laid diagonally is the strongest. Building paper should separate the sub and finish floor.

5. Windows — Open the windows. If they stick, they may be squeezed by too much pressure on the sill. Gaps around windows mean drafts and show poor workmanship.

6. Crawl Space — Is there sufficient crawl space under the unexcavated portions of the house to allow for repair of pipes, electrical wiring and ducts? Space should be at least 2½ feet deep and well ventilated.

7. Is the Heating Plant Adequate — Is the plant gas or oil burner, a stoker, or is it a hand-fired model? Automatic types are most desirable. Is the insulation covering in good repair? Note the interior for cracks. Inspect the heat ducts — the pipe from the furnace to the chimney should be in good condition.

8. Wiring — Check the condition and adequacy of the electric system. Note the number of supply wires into the meter box from the outside — 2 wires for 110-volt circuit; 3, 220-volt. Look at the fuse box. Lighting branch circuits usually have 15 ampere fuses and appliance circuits 20 or more.

9. Plumbing — Check the exposed plumbing for rust or corrosion. Find out where the water comes from. Find out whether the sewage discharges into the municipal sewer, a cesspool or septic tank. Drainage should be quick and quiet. Low pressure upstairs may mean pipes choked by mineral deposit or rust.

10. Basement Drain — Pour water down the drain to see that it operates properly.

11. Fireplace — If there is a fireplace on the floor above, note whether the hearth is supported only by the floor framing. A method should be provided to dispose of fireplace ashes in the basement, or outside, to keep dirt out of the living room. It should be lined with firebrick and have a workable damper.

First Floor View

1. Floor — Floor should be solid, not squeak, not slope toward one corner. Look under the sink for sound flooring.

2. Interior walls — If they are plastered, check them for cracks, metal corner beads should be used to prevent damage to the plaster. Twisted wallpaper at the corner means the wall has settled.

3. Doors and Windows — Check their condition; make sure the sash has not started to rot. Notice if there are locks and window lifts. Check also for weatherstripping. The type of wood used will provide a key to the amount of money used in the finishing work. Make sure catches and locks on the doors work.

4. Closets and Storage Space — Each bedroom should have at least one closet or wardrobe. Storage space adds to the livability of a home.

5. Electrical Outlets — If you have an electric range, you must have a power service entrance. You will need outlets for refrigerator and appliances.

6. Hardware — There are three kinds available: plated, plastic, and solid brass or bronze.

The Attic View

1. Rafters — Rafters, like joists and studs, should be spaced 16 in. apart on centers. Collar beams lend strength to roof structure. If the attic has not been floored, you can see if the sides of the house have been insulated. The attic should be ventilated by windows or louvers.

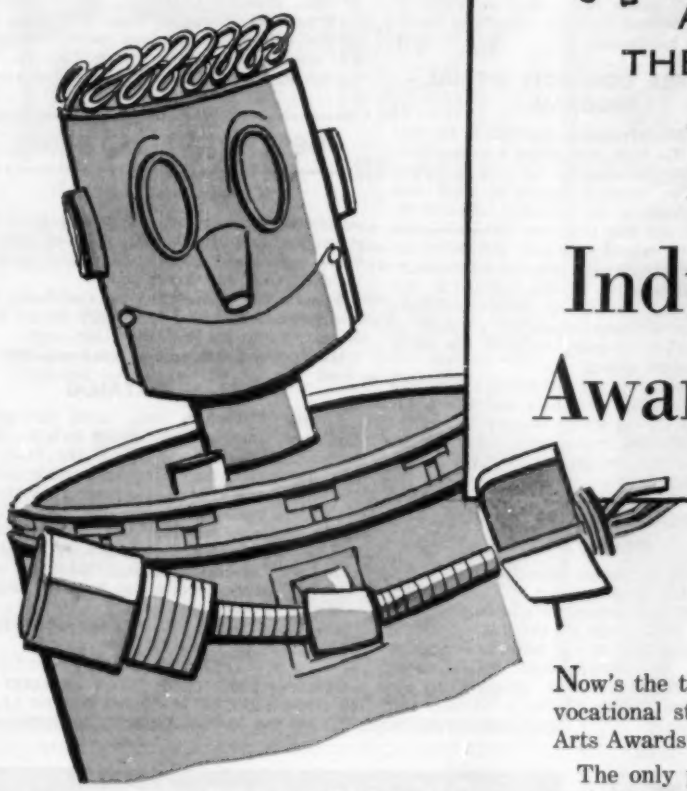
2. Chimney Framing — If the chimney rises through an unfinished attic, check masonry. There should be no wood framing within 2 inches of the chimney to eliminate fire hazard.

Miscellaneous Check List

1. Utilities: electricity, gas, water, sewer, telephone, and garbage disposal.
2. Transportation: railroad, bus
3. Protection: fire, police, street lighting, snow removal
4. Insurance
5. Street improvement
6. Design of house
7. Room arrangement
8. Location and setting
9. Nuisances: noise, smoke
10. Neighborhood, churches, schools, stores
11. Proximity to community services

With the knowledge of the findings in checking the house, you will now have a good indication of its condition. The house, if it is old, must first meet your needs and be livable before you would buy it.

More than half of the members of the first regiment of the Arizona National Guard organized in 1865 were Indians who protected the settlers against marauding bands of Apaches, outlaws and rustlers. — *Information Section, Wisconsin Military District.*



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Almost any industrial arts or vocational industrial project made by students in the 7th through 12th grades may be entered in the I.A.A. Program. Complete information should reach you by December 15th. If it doesn't, write Ford Industrial Arts Awards, American Road, Dearborn, Michigan.

Take this once-a-year opportunity to help your students gain national recognition for their work!

FORD MOTOR COMPANY

BUSINESS & PERSONAL NEWS

(Continued from page 31A)

three years in Whitewater, Wis., schools before joining Rockwell in 1952. He was appointed regional school specialist the following year after serving as an order editor at a Delta plant.

John J. Cadigan, New Jersey industrial-arts teacher, has joined Rockwell Manufacturing Company's Delta Power Tool Division as Eastern regional school sales specialist.

Mr. Cadigan succeeds William MacLachlan.

An industrial-arts graduate of Trenton, N. J., State Teachers College, Mr. Cadigan comes to Delta from a teaching position at Hanover, N. J., High School. Earlier he taught at Moorestown, N. J., High School and Riverton, N. J., Elementary School. He also completed postgraduate work at the University of Virginia and Rutgers University.

He will make his headquarters at Rockaway, N. J.

EICO TO HANDLE NEW SPEAKER SYSTEM

Harry R. Ashley, president of Electronic Instrument Co., Inc., manufacturers of EICO line of test instruments and high fidelity in both kit and wired form, announces an agreement with Hegeman Laboratories, Glen Ridge, N. J., for exclusive rights to manufacture and distribute the new Hegeman Standard Speaker System.

This system, to be known as the EICO Standard Speaker System, is claimed to be a new milestone in the loud-speaker art. Incorporating new inventions and techniques by its designer, including a hemispherically radiating tweeter and a slot-loaded bass horn, it achieves a new high in naturalness and sonic detail. This design has been field tested through small lot production over the past year.

EICO will make this system available in completely finished form in a choice of hand-rubbed fine hardwoods.

CRUCIBLE CONDUCTS SPECIAL PROGRAM

Crucible Manufacturers Association, for several years, has been conducting a program to promote the introduction of and increased enrollment in foundry courses in trade and technical schools at the secondary school level. In carrying out this objective the Association instructed its school education committee to supply such schools with technical information.

In partial response to this instruction, the Committee has developed recommendations covering the minimum equipment required to set up a school foundry to meet the needs of a 20-student group.

In addition to listing equipment, the recommendations include cost data and also a diagram of a typical school foundry layout.

Copies of these recommendations may be secured free by writing to Crucible Manufacturers Association.

BLACK & DECKER AT THE METAL SHOW

The Black & Decker Manufacturing Company, world's largest maker of electric tools, will feature and demonstrate its new 1¼-in. Magnetic Drill Press at the 1957 National Metal Exposition to be held November 4 to 8, at the International Amphitheatre, Chicago, Ill. Other new products to be demonstrated include Shears, a Nibbler, and Holguns.

Black & Decker will occupy booth 241 in the North Hall of the Amphitheatre. Personnel manning the booth will include Arthur S. Boehm, sales manager, industrial automotive division; Edward J. Bernau, central regional sales manager; Harry L. Bullock, Chicago industrial-automotive division sales manager; and sales representatives from Chicago, Indianapolis, Detroit, Cleveland, and Cincinnati.

DESCRIPTIVE MATERIAL

(Continued from page 44A)

simplifies classroom teaching, methods of instructions, and the various units of instructions contained in the assignment booklet included with each instrument.

For further information on the Radio Instructional Panel, and for copies of the bulletin, write to H. H. Buggie, Inc.

(For further details encircle index code 0921)

1957–58 CATALOG

Delmar Publishers, Inc., have announced their new Catalog D957, which includes their complete listing of books in the fields of automotive training, blueprint reading, building trades, bricklaying, carpentry, drafting, electricity, guidance tips, instrumentation, machine drawing, machine shop, mathematics, mechanical drawing, needle trades, painting, plumbing, practical nursing, printing, sales training, science, sheet metal, teacher training, and tool design.

(For further details encircle index code 0922)

(Continued on page 37A)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION.

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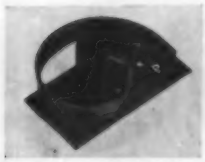

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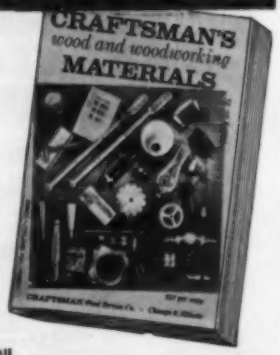

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- New! Hardware for baby cribs, typewriters, folding legs
- Many new woodworking tools
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KEY TO WEAVING

Mary E. Black

Here it is, the most complete and comprehensive book on weaving in print! It tells the weaver exactly what to do and *why*, presenting techniques and instructions for over a hundred weaves. Each weaving sample is illustrated with a photograph of the weave and drawings of the tie-up and threading draft. The perfect text for the beginner as well as the experienced weaver. $12.00

THE BRUCE PUBLISHING CO.

711 Bruce Bldg. Milwaukee 1, Wis.

DESCRIPTIVE MATERIAL

(Continued from page 34A)

EICO NEW HIGH FIDELITY CATALOG

Electronic Instrument Co., Inc., has recently released its new black-and-yellow 6-page catalog describing the EICO line of high fidelity equipment in both kit and factory-wired form.

Called Form A5, the catalog contains full specifications and features on: the HF61 Master Control Preamplifier, HF60 60-watt Ultra-Linear Power Amplifier with ACCRO TO-330 Output Transformer, HF50 50-watt Ultra-Linear Power Amplifier with Chicago Output Transformer, HF52 50-watt Ultra-Linear Integrated Amplifier, HF20 20-watt Ultra-Linear Williamson-type Integrated Amplifier, HF12 12-watt Williamson-type Integrated Amplifier, and HFS1, Two-Way Speaker System with factory built cabinet.

For your free copy of this new catalog, write to the company.

(For further details encircle index code 0923)

NEW BULLETIN ON P & H WHITEPRINTER

A colorful, illustrated Bulletin No. 57A1 on the new Peck & Harvey Arrow Automatic Dry Process Whiteprinter has been issued by P & H Sales Corporation.

This new bulletin fully describes the modern P & H Arrow Automatic 26-in. 75 ft./min., 100 w/in. Whiteprint machine which was research-engineered to print and develop 97.7 per cent of all cut sheet reproductions at high volume speeds with compact efficiency at lower cost.

The bulletin illustrates and explains important functional features of the new Arrow, and also describes available Arrow accessories for roll stock use, automatic rewind, and hi-lo lamp intensity control.

A copy of Arrow Bulletin No. 57A1 is available upon request.

(For further details encircle index code 0924)

NEW "PRESS-RITE" CATALOG

Two new single back geared presses of 30 ton and 37½-ton capacities are included in a catalog showing the complete line of 2-ton to 85-ton Press-Rite O.B.I. Power Presses.

Illustrations and description of all presses and press features with complete specifications are included.

Write for Bulletin No. 757 from Sales Service Machine Tool Company.

(For further details encircle index code 0925)

SAMS ANNOUNCES NEW BOOKS

Howard W. Sams & Co. Inc., have announced the release of "Learning Electricity Fundamentals" by Leonard R. Crow.

This book strips electricity of its mysterious sounding terms and explains its character in easy-to-understand words. It will prove equally useful for those who intend to confine their attention to such subjects as the operation and maintenance of electric motors and appliances . . . and the wiring of homes.

This book clearly presents the basic laws, theories, and practical applications of electricity; operation of a.c. and d.c. motors; transformers; generators; circuits and controls; practical wiring; etc.

Priced at $5.95, this clothbound book with 416 pages, carries catalog No. EFC-1, and is sold through electronics parts distributors.

Another book announced recently is "Electronics Reference Data." This book will provide a ready reference to the many subjects encountered in the field of electronics. The wide variety and completeness of this data will prove helpful to service technicians, experimenters, students, amateur radio operators, or anyone concerned with the technical side of the electronics industry.

The data presented and illustrated covers the design, application, and theory of operation of many TV circuits; various oscillator circuits; waveforms and wave shaping; meters and measurements; and covers specialized application and development of such equipment as Geiger counters, photoelectric cells, printed circuits, citizens radio service, etc. The characteristics and proper uses of various components used in electronics is also given. Other equally valuable subjects are treated, including elementary Binary arithmetic.

"Electronics Reference Data" contains 128 pages, is paper bound, 8½ by 11 in., and carries catalog No. ERA-1. It is priced at $2, and is sold through electronics parts distributors.

"Automatic Record Changer and Tape Recorder Service Manual, Volume 9" has been released also.

This volume presents complete service information on 14 tape recorders and four record changers produced in 1956.

Presented on each recorder and changer are the exclusive copyrighted "Photofact Exploded Views," operational date, and detailed service instructions originated by the Howard W. Sams engineering staff.

The index lists all models which were presented in the first eight volumes as well as those covered in Volume 9.

Containing 256 pages, 8½ by 11 in., this volume carries catalog No. CM-9, and sells for $3.95, through electronics parts distributors.

(For further details encircle index code 0926)

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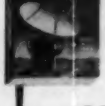
NEW knight Dual-Speed Push-Button Automatic Tape Recorder

Judged "Best Buy" among recording experts and educators. Features push-button keys for instant recording, playback, rewind, stop or fast forward operation. Renowned for faithful reproduction. Has 2-speed (7½" and 3¾" per second) dual-track recording mechanism and efficient erase system. Records up to 3 hours on a single tape. Hum-free transistorized preamplifier; quality 3-watt amplifier; 4 x 6" speaker; dual neon-glow level indicators; tone control; safety interlock to prevent accidental erasing. Simple to operate. Attractive portable case. Complete with microphone, 5" reel of tape and take-up reel. Shpg. wt., 29 lbs.
91 RZ 751 KNIGHT Recorder, only..... $94.95



FREE 404 PAGE 1958 CATALOG

Send for the leading buying guide to everything in electronics for the school: sound and recording equipment; KNIGHT-KITS for training; Lab instruments, tools, books, electronic parts. Write for FREE copy today.

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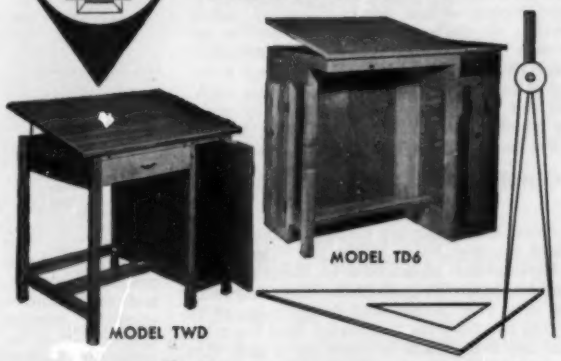


Your Drafting Room or Art Department will be better equipped when you specify PRECISION BUILT TOLCO units. The many different Tolco models are built and finished to give years of maintenance free service. Northern Hard Maple frames—bolt reinforced mortised and tenoned joints—adjustable warp free work surfaces. There is a Tolco unit just right for your school and budget.

Write For Complete Information

THE TOLERTON COMPANY
265 NORTH FREEDOM AVE. ALLIANCE, OHIO

Shop Equipment News

BLACK & DECKER IMPACT WRENCH

The Black & Decker Manufacturing Company announces a new Impact Wrench — the No. 300 — with a torque range of 300–450 ft. lbs. This unit augments the electric tool company's No. 100 Impact Wrench, introduced last year, as a higher capacity tool of equal quality for heavy-duty construction, maintenance, and repair work.

No. 300 Impact Wrench for heavy industrial use

The No. 300 Impact Wrench is built for rugged wear, with a die-cast aluminum housing, lubricant-sealed ball bearings, and heat-treated gears. Powered by a special Black & Decker-built motor for use on both a.c. and d.c. current (available for either 115 or 220 volts), the tool is ideal for large, heavy nut running of 7/8-in. diameter and up, as well as for cap and lag screw driving and removal. A specially designed centrifugal fan and ventilating system give this tool the coolest possible operating temperature at all times.

The No. 300 Impact Wrench features ease of operation, with an adjustable auxiliary handle for better operating balance, a positive control reversing switch, and an instant release trigger switch for split-second power control. It reaches maximum torque in six seconds — faster than any other comparable unit. This extra speed can save hours every day in assembly, disassembly, and repair work, and can increase production output by making possible more work per operating hour.

(For further details encircle index code 0901)

QUICK-LOAD VISE FOR CIRCULAR SAW FILING

Foley Manufacturing Company have introduced the new Foley Model 346 Filing Vise.

Circular saw blades of 4 to 18-in. diameter may be sharpened quickly and accurately with the new vise. Blades with arbor holes of ½ to 1¾ in. slip over a threaded stud assembly and are held firmly in place by a cone that engages stud threads when a plunger is released. The cone is then turned for desired amount of tension, allowing blade to be rotated by file pressure to bring each tooth into position.

This slip type saw cone remains together at all times, so there is only one piece to release for reversal or removal of saw blades. The rigid back vise supports the blade at filing point to prevent chatter. When filing large saws, a spring tension lever swings down over the blade for increased tension and to prevent vibration.

Foley Model 346

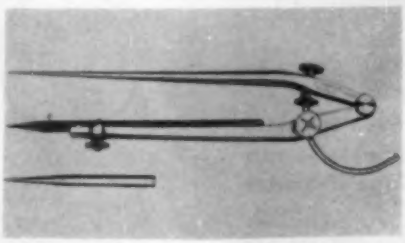
Adjustment is fast and positive. Saws may be filed either vertically for straight across filing, or locked at any desired tilt angle to 45 deg. Slotted angle adjustment bar is stamped with markings of 15 deg., 30 deg., and 45 deg., for accurate positioning at desired slant. A single lock-tight hand wheel provides vertical positioning of blade so that teeth extend just above the top of the vise.

Model 346 is sturdily made, designed for bench mounting.

(For further details encircle index code 0902)

NEW HEAVY DUTY DIVIDER

The L. S. Starrett Company have introduced a new 9-in. Heavy Duty Divider, which features fine adjustment, rigid construction, and firmly locked settings plus a steel point that is interchangeable with a standard long pencil.



New Starrett No. 92 Series 9-inch Divider can be used with steel scribing point or standard long pencil

Sturdily constructed of tempered and highly polished forged steel for rigidity, light weight and easy handling, the tool is designed to eliminate wandering when scribing coarse grained wood or rough surfaced metal. A quadrant projecting through the legs and locked by a knurled clamp screw, eliminates side deflections. A check nut, spring and quadrant adjusting nut permit fine adjustments for close measurements. Tightening the check nut prevents the legs from moving in or out from the established setting.

Also available in the No. 92 Series are dividers of similar design in 6-, 7-, and 8-in. sizes.

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION.

A complete catalog of Starrett precision measuring tools is available on request.

(For further details encircle index code 0903)

NEW HEAVY DUTY RADIAL-ARM MACHINES

DeWalt Inc., subsidiary of American Machine and Foundry Company, have introduced a new "Imperial" line of radial-arm wood and metal cutting machinery for industry. Designed for the nonferrous metal market along with the heavy wood cutting industry, the new model will fill a need for a heavier, more rugged and accurate radial-arm machine. The square, simple lines follow the modern trend in machine styling.

The New "Imperial" Radial-Arm Machine

Greater strength is achieved in the Imperial by the steel table frame which is 2 in. deeper and supported by longer flanged legs. There is a longer column and column base for greater rigidity, and stronger cleats have replaced bolts in the table top. An adjustable front extension to the table top prevents the blade from extending beyond the table in crosscut position. It has a maximum 16⅞-in. rise between the table top and motor bottom.

Built-in power features are offered as standard equipment to reduce operator fatigue.

Added safety and efficiency is achieved by new developments and exclusive engineering advances.

(For further details encircle index code 0904)

BORDEN COMPANY'S "PERMA-MAT"

A ribbed plastic matting with numerous applications in the home is being introduced by the Borden Company's Chemical Division. Called "Perma-Mat," this tough, economical, nonskid material is expected to replace conventional rubber matting in many instances.

It is excellent for hallway runners, stair runners, drainboard coverings, shelf mats, place mats, automobile floor mats, rainy-day rug protectors, and similar uses. "Perma-Mat" is translucent, permitting existing colors to show through. It can be cut with ordinary scissors, and is reversible.

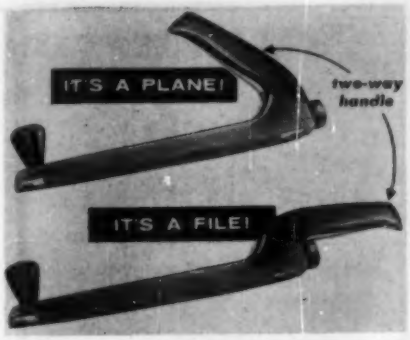
This polyethylene plastic is available at hardware, variety and department stores in rolls 30 in. wide and 6, 50, and 100 feet long.

Additional information may be obtained upon request.

(For further details encircle index code 0905)

NEW COMBINATION TOOL — "PLANE-'R-FILE"

Millers Falls Company announces a unique new, combination tool that makes it possible to plane, file, shape, and smooth anything from soft wood to tough steel — all with a single tool, and at extremely low cost.



New Dual-Purpose, Miracle Tool

It is named Plane-'R-File, because it is equipped with a two-way handle which converts the tool in a few seconds, from a plane to a file and back again.

The patented blade is manufactured for Millers Falls by the Tresa File Company of England. It is made of specially hardened steel, and has two rows of cutting teeth with edges almost glass hard. It cuts practically anything — wood, plastic, metals — and leaves a smooth, even surface no matter whether it is used with or across the grain.

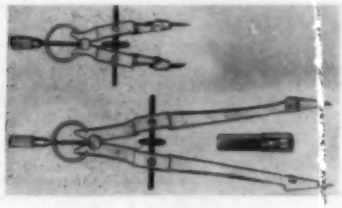
It is nonclogging, flexible, double-sided for double life, it is easily reversible to bring an entirely new cutting surface into action, and it is replaceable. Inexpensive extra blades are available with either coarse or medium teeth.

Homeowners, hobbyists, mechanics, carpenters, cabinetmakers, plumbers, electricians, service and repairmen will find wide uses for this versatile and handy new tool.

(For further details encircle index code 0906)

ELUXITE ALUMINUM BOW INSTRUMENTS

For those who need a universal-type bow, Alvin & Company has constructed in three popular sizes, the 7½-in. King Bow (circles from ⅛ in. to 14-in. diameters), 5½-in. Queen Bow (circles from 3/32 in. to 10-in. diameters), and the 3½-in. Mighty Mite (circles from 1/16 in. to 5-in. diameters). These aluminum bows will perform 95 per cent of all circles drawn by draftsmen and designers.



Eluxite Aluminum Bow Instruments

These imported Eluxite aluminum bow instruments are outstanding examples of skilled craftsmanship and construction. Perfectly balanced, easy to hold, easy to use, light weight, nonglare in finish, all bows are attractively boxed, containing a plastic tube holding extra leads, divider needle, and spare parts.

Further information may be obtained on request.

(For further details encircle index code 0907)

GIANT SUPER AIR POWER RIVETER

Barrett Equipment Company have made available their Giant Super Air Power Riveter that does a multitude of jobs. It is air powered for speed and operating ease. The 4-in. throat with capacity up to 3/8-in. solid brass, copper, and iron rivets makes this all-new riveter ideal for servicing automotive, earth-moving and industrial equipment; fabrications of storm sash and jalousies; aircraft maintenance and fabrication; and hundreds of sheet-metal applications, such as punching, slotting, and notching operations.

Giant Super Air Power Riveter

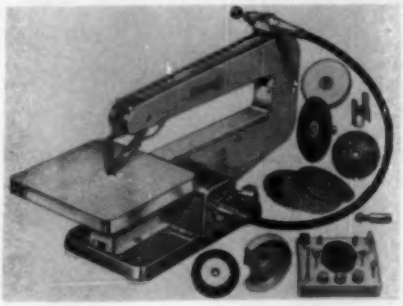
Rugged construction insures a lifetime service. Instant change toolholder provides for rapid change of punches, knurls, etc. It features an adjustable ram stroke and quick release air valve, and makes special tooling available.

The riveter is obtainable in bench and de luxe floor model.

(For further details encircle index code 0908)

MULTI-PURPOSE POWER SHOP

Dremel Manufacturing Company have introduced a new power workshop especially designed for elementary and high school classrooms. Called the Model 57 Moto-Shop, the unit is powered by a ball bearing rotary motor embodying a unique power take-off, to which a number of attachments can be added.



Multi-Purpose Power Shop

From a 19-in. jig saw, it can be quickly converted into a disk sander, bench grinder, buffing tool, and a flexible shaft machine. Weighing only 12 lb., the Moto-Shop can be set up on a small table anywhere in the classroom. It will cut 1¾-in. wood, 18-gauge copper, plastics, light metals, etc. The table tilts for angle and bend cutting. A clever and virtually foolproof safety guard completely

(Continued on next page)

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SEE the NEW 1957-58 Models

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AUTOMOTIVE ENGINES — Maintenance & Repair

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Among the additional features in this enlarged edition is an up-to-date new chapter devoted to foreign engines.

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Fills the gap in vo-ag and automotive education.

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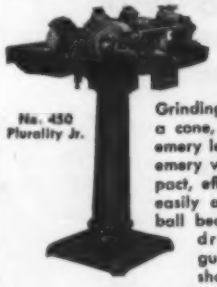

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NOW AVAILABLE IN 3 SIZES
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Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

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Originators and Pioneer Manufacturers of Oilstone Tool Grinders

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FINEST IN WOODS

Manual Training Teachers— this manual contains many suggestions for Class Projects in addition to every conceivable item for woodworking.

TOOLS AND MATERIALS

CONSTANTINE'S latest catalog; 126 pages, many in color. Everything you need in hard-to-get hardware and supplies. Also, Veneers, Inlays, Carvings, Mouldings, Upholstery Supplies, Plans, How-to-do-it and wood finishing articles. 83 inlay designs and bid wood identification panel of over 60 woods . . . all in natural color. Finest book ever offered. Send for copy, (free to teachers — others 25c refunded on 1st order).

ALBERT CONSTANTINE & SON, INC.
2062E Eastchester Road New York 61, N. Y.

SHOP EQUIPMENT NEWS

(Continued from previous page)

surrounds the blade, making it safe for even a six-year-old.

The attachments have many applications in arts and crafts work, particularly the flexible shaft. It can be used for grinding off ceramic stilt marks, polishing jewelry, engraving, routing, drilling holes in jewelry, removing fine scale from copper, etc. It is exceptionally handy for drilling holes when making inside cuts with the jig saw.

(For further details encircle index code 0909)

BLACK & DECKER MAGNETIC DRILL PRESS

The Black & Decker Manufacturing Company announces a new 1¼-in. Magnetic Drill Press, for heavy industrial drilling, which is tolerance-built to drill holes within 1/64-in. accuracy. Designed for continuous operation, on either a.c. or d.c. current, the press will not overheat and thereby reduce its magnetic hold after a few hours. Among other exclusive safety and accuracy features of the Press are (1) drill point locator for immediate, exact positioning, (2) two-piece construction for ease of handling, and (3) remote control hydraulic power feed which enables the operator not only to drill with little effort, but also to stand clear of the work.

Magnetic Drill Press in action

Exclusive remote control hydraulic power feed permits easy control when drilling overhead, in a side wall, or in the center of a large area. The operator can stand as far as six feet from the unit during drilling operations for convenience and safety. The hydraulic device controls the amount of pressure applied to the bit, with a built-in overload release valve to prevent excessive drill point pressure.

The unit is furnished as standard equipment along with the conventional hand-free lever.

(For further details encircle index code 0910)

NEW TUBE CONTAINER FOR ROGERS GLUE

Rogers Isinglass & Glue Company, manufacturers of the famous Rogers Liquid Fish Glue, announces a new easy-to-use tube container for their 20-cent tube of Rogers Glue.

The new tube is now a half inch longer and contains a full ounce of glue. Decked with the same red and yellow brilliant design combination, the tube is topped by a 3/8-in. metal noselike projection that now makes application of Rogers Glue a pleasant pastime. The pro-

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Free booklet "How To Sharpen Saws"
See May issue Industrial Arts & Vocational Education page 16A. Learn how Quick-Way Saw Sharpener cures dull saw blades. Complete, nothing else to buy. Quickly pays for itself. New price $19.95.
QUICK-WAY SAW CO.
142 Tompkins St. Cortland, N. Y.

SHOP FURNITURE FOR 1957 SHOPS

1. Four-Station Workbench for high schools with built-in tool cabinets, sliding doors to lockers.
2. Workbench for junior high schools with or without tools and storage space for tools.
3. Four-Station Workbenches with tools for elementary schools and a novel saw-bench.
4. Four-station drafting and planning table with storage for all drafting equipment.
5. Wall-tool Cabinets and Bench-Tool Cabinets.
6. Metal Working Benches, sheet-metal Benches and Stake-plate Bench with concealed storage for stakes and machines.
7. Anvil Base with storage for anvil tools.
8. DeLuxe Drafting Table with complete equipment storage including T-squares and boards.

GO MODERN! USE SHOP FURNITURE DESIGNED FOR HANDLING LARGER CLASSES WITH LESS DISCIPLINE PROBLEMS.

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CHARLESTON, ILLINOIS

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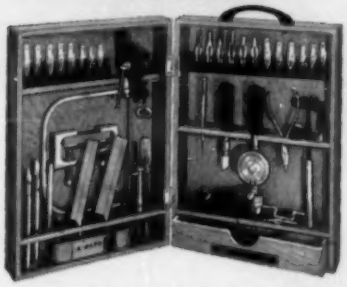

Above is the HANDICRAFT DIRECTOR'S favorite "49'er" Hobby Chest containing full assortment of tools, knives and blades. Just a sample of the hundreds of handicraft kits, knives and tools illustrated in X-acto's Buying Guide. Only 25c a copy.

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The cleaning and care of paint brushes used with today's fast drying finishes requires modern, more efficient methods. Protexem VAPOR ACTION Brush Conditioners employ a scientific proven method that softens hard-as-rock brushes and keeps stored brushes always ready for use. Eliminates fire of liquid in open containers.

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Protexem VAPOR ACTION Brush Conditioners offer you a modern brush cleaning and storing method that saves time, saves brushes and helps improve work.

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on Protexem brush conditioners and the modern way to clean and store brushes.

WISCONSIN LABORATORIES, Inc,
Dept. IA Dousman, Wisconsin

jection allows the user to spread the glue evenly, smoothly, cleanly, thinly, without erratic spurts of huge blobs. The top of the projection is pricked open with a common

New Tube Container for Rogers Glue

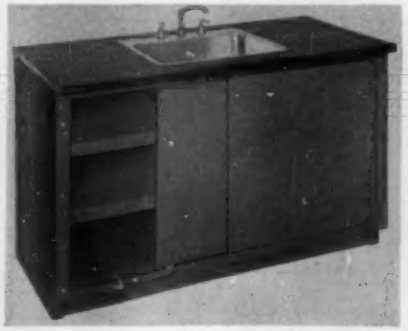
pin, or a carpenter's nail, and can be sealed again by a common pin, or carpenter's nail, to keep the glue tight against leakage or drying, ready for instant use.

Rogers Glue is ideal for both home and industry, and has been hailed by carpenters, woodworkers, mechanics, home craftsmen, and upholsterers as the glue that does the job right and fast. Tests prove that Rogers Glue sticks with an iron grip on wood, leather, fabric, rubber, glass, crockery; it is crystal clear, and dries with lightning speed.

(For further details encircle index code 0911)

NO. 6125 "PARENT" LABORATORY BENCH

Parent Metal Prducts, Inc., have announced their new laboratory bench, No. 612S. It is equipped with 1¾-in. carbonized maple top, either 4, 5, or 6 ft., by 29 in. deep, with a working height of 35 in. The sink is a deep-drawn stainless steel type with a rubber undercoating. The bowl size is 22 by 16 in., with a depth of 7½ in. It is equipped with a swinging mixing faucet.



No. 612S "Parent" Laboratory Bench

The sink is furnished with a basket strainer and a 4-in. long 1¼-in. tailpiece. The all-steel base has two adjustable shelves and steel sliding doors with cylinder lock. The base has set-in toe space for greater working comfort. The base is Standard Green Enamel.

(For further details encircle index code 0912)

(Continued on next page)

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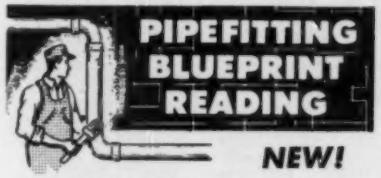

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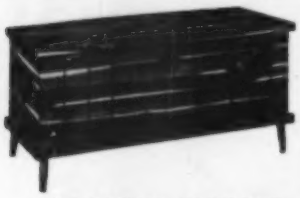

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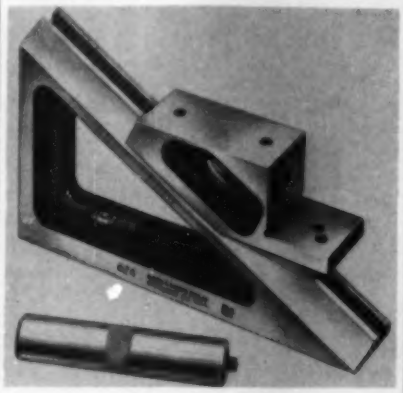
SHOP EQUIPMENT NEWS

(Continued from previous page)

NEW TOOL SETTING GAUGE

Brown & Sharpe Manufacturing Company have announced a new gauge for precisely setting cutting tools on machines. This No. 624 Planer and Shaper Gauge, in addition to its exceptional stability, has beveled ways which eliminate side play and provide accurate alignment and parallelism between the working surfaces.



New Tool Setting Gauge

With an extension usable on three surfaces, No. 624 has a range from ¼ to 10 in. It incorporates a precision level and the platform has an extra tapped hole to accommodate a post for indicators and other accessories. The base and slide are steel forgings and they and the extension are hardened and ground.

(For further details encircle index code 0913)

NEW MODEL 25B EASTMAN PROJECTOR

Eastman Kodak Company have made available their new model 16mm. projector, which offers 20 per cent more illumination and which may be adapted for magnetic as well as optical sound.

The new Eastman 16mm. Projector Model 25B

This new 16mm. Projector, Model 25B, provides much greater shutter-light transmission than the previous model, and it now makes professional theater-quality brightness possible on screens 25 to 35 feet wide.

Included as standard equipment on the Model 25B is the newly developed Eastman Optical-Magnetic Pre-amplifier, which will accommodate the signal output of a magnetic sound head as well as the standard optical system.

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Reproduction of magnetic sound with the projectors may be accomplished by field installation of another new device, the Eastman Magnetic Sound Playback Kit, now offered as accessory equipment. Installed in an adjustable mount on the projector, the kit converts the Model 25B for interchangeable or simultaneously mixed handling of either magnetic or optical sound tracks.

(For further details encircle index code 0914)

Descriptive Material

NEW WALKER-TURNER CATALOG

Walker-Turner Division, Rockwell Manufacturing Company, have made available their new 48-page catalog, which describes their complete line of "light-heavyweight" machine tools, including new tools recently introduced.

The greatly expanded line includes band saws, circular saws, cutoff machines, drill presses, radial drills, grinders, lathes, a spindle shaper, a scroll saw, a belt and disk surfacer, and a jointer. Various models are designed for metal- and woodworking, lumber yard and construction operations, and schools. Components of many of the tools are listed separately so that industrial customers may build low cost machinery for a particular production job buying only the tool parts needed.

Capacities, speeds, and dimensions of each model are listed separately from general descriptions to make selection of the right tool for the right job easy. A listing of accessories following the description of each tool also facilitates use of the catalog.

Catalog is available upon request.

(For further details encircle index code 0915)

ATF CHIEF 22 INSTRUCTION MANUAL

A new instruction manual for the ATF Chief 22 Offset Press has recently been released by American Type Founders Company.

The 8½ by 11-in., 32-page booklet describes in detail all presswork procedures for the most efficient production on the Chief 22, which handles sheets from 8 by 11 in., to 17½ by 22 in. Steps to take in press preparation, trial printing, and printing operation are outlined and illustrated. The maintenance and operation of ink and water distributing rollers, wash-up device, lubrication, blanket, plate and impression cylinders, feeder and delivery, water mechanism, moisture control, and inking mechanism are carefully reviewed.

For further information write to American Type Founders Company.

(For further details encircle index code 0916)

MOTION PICTURES TO AID WELDING INSTRUCTION

A series of 16mm. motion pictures, graphically portraying the fundamental techniques of oxyacetylene welding and cutting, has been produced by Linde Company, Division of Union Carbide Corporation. The seven reels, in full color and sound, include these titles: Braze-Welding; Fusion Welding; Flame-Cutting; Fusion Welding of Light-Gauge Steel; Flame-Grooving; Hard-Facing; The Air-Acetylene Flame. Running time for each is approximately 10 minutes.

An additional film, entitled "The Oxy-Acetylene Flame — Master of Metals," also in 16mm. sound and color, is a nontechnical

(Continued on next page)

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DESCRIPTIVE MATERIAL

(Continued from previous page)

introduction to oxyacetylene processes, tracing their development and present-day uses in easily understood terms. Running time is 20 minutes.

These valuable teaching aids are available on free loan, for educational programs, through local distributors of Linde products for welding and cutting, as well as through the offices of Linde Company, located in principal cities throughout the United States.

(For further details encircle index code 0917)

1957–58 CATALOG

The Bedford Lumber Company have announced their new price list which includes descriptive material on their beautiful chests and other items of furniture made of solid Tennessee Aromatic kiln-dried Red Cedar.

This chest stock is made in Tennessee. All panels are glued up, sanded to ¾-in. stock, and cut ready to assemble. Furnished with red cedar trim, also molding for top and bottom, as well as handles, feet, and ornament for front panel. Hardware is furnished with each chest and consists of combination hinges, lid checks, lock, glides for feet and all screws.

Other items of furniture include all hardware, and metal leg hangers and ferrules for all round legs.

Copies of the catalog are available upon request.

(For further details encircle index code 0918)

NEW EASTMAN BOOKLET

Eastman Kodak Company have issued an entertaining and informative booklet called *"how I learned the VERIFAX of life."*

It is a bright little story about Kodak's versatile office copier written by Don Harold, including illustrations done in the author's own inimitable style. In his book the author shares with the reader his delight in what he discovered about the Kodak Verifax Copier.

This humorous, but helpful booklet, is free, for the asking.

(For further details encircle index code 0919)

ALLIED RADIO CORP. CATALOG

Allied Radio Corporation announces the release of its new 1958 catalog (No. 170) which features an unusually large selection of electronic parts and equipment for use in schools, classrooms, laboratories, and shops. It consists of 404 pages (192 pages in rotogravure and 4-color covers), and lists over 27,000 items. Of special interest to teachers and other school personnel is the greatly expanded section on training kits, recording and test equipment, books, diagrams, parts and tubes, and other equipment required for radio and electronic training activities.

The catalog also offers complete selections of TV antennas, converters, and other TV accessories; phonographs; communications receivers, photoelectric equipment; fluorescent fixtures, and lamps.

The catalog is available without charge.

(For further details encircle index code 0920)

BULLETIN ON RADIO INSTRUCTIONAL PANEL

H. H. Buggie, Inc., have recently published their new 4-page bulletin entitled "How to Simplify the Teaching of Radio Repair."

This bulletin describes the basic functions of the Radio Instructional Panel, how it

(Continued on page 34A)

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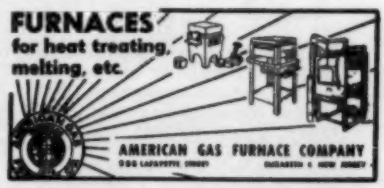
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1161	**LeBlond Machine Tool Co., R. K.** ..... 4th cover Complete line of lathes.	
1162	**Logan Engineering Company** ..... Lathes.	10A
1163	**Machine Shop Project Service** .... Instructional kits.	44A

(Index continued on next page)

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION November, 1957
400 North Broadway, Milwaukee 1, Wisconsin

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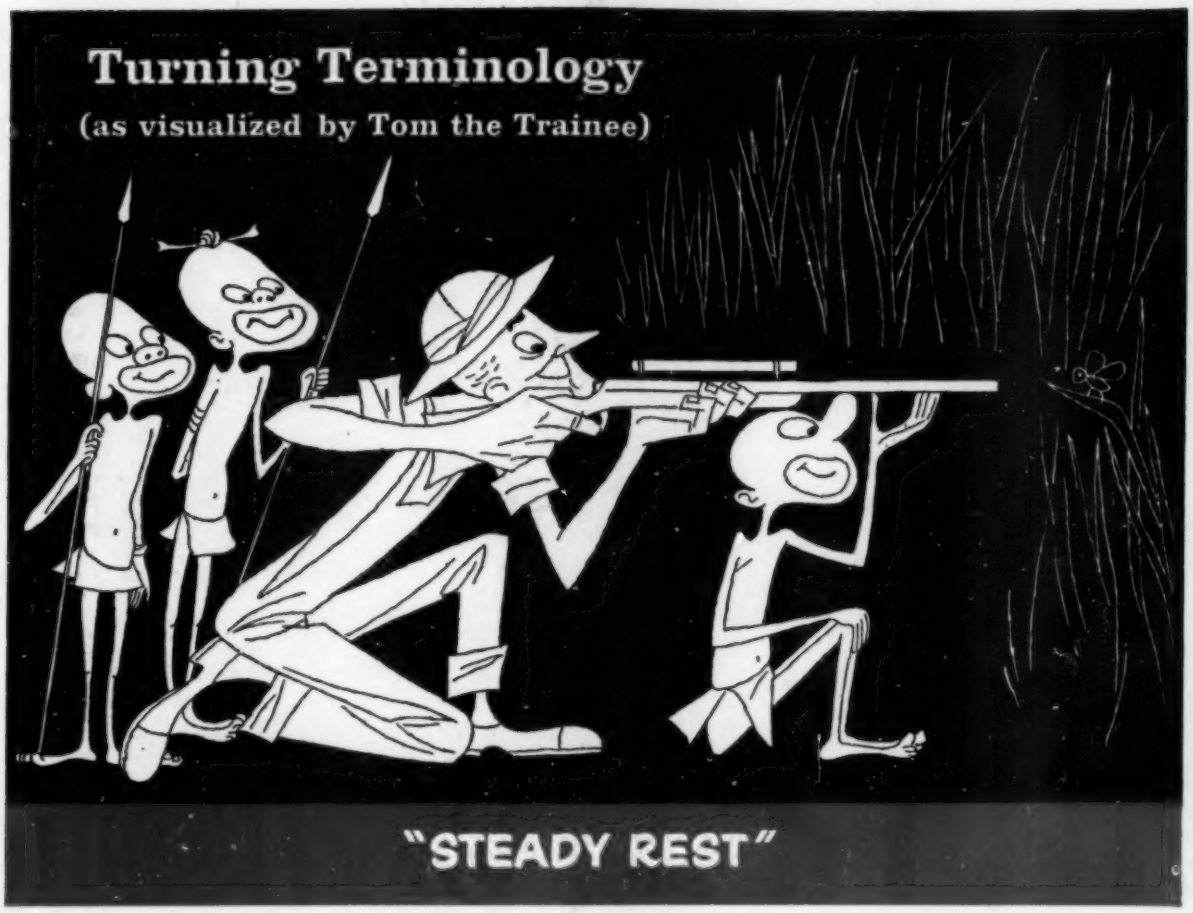

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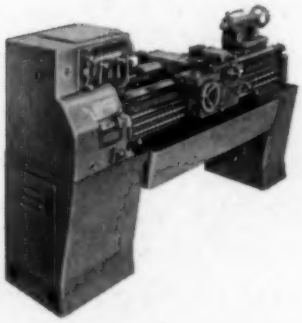

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